

August 16, 2010

10/581,005

1

=> FIL REG
FILE 'REGISTRY' ENTERED AT 13:08:44 ON 16 AUG 2010
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=> D HIS NOFILE

FILE 'HCAPLUS' ENTERED AT 09:18:10 ON 16 AUG 2010
E US2006-581005/APPS
L1 1 SEA SPE=ON ABB=ON PLU=ON US2006-581005/AP
E DE2003-10357315/APPS
L2 1 SEA SPE=ON ABB=ON PLU=ON (DE2003-10357315/AP OR
DE2003-10357315/PRN)
L3 1 SEA SPE=ON ABB=ON PLU=ON (L1 OR L2)
SEL L3 RN

FILE 'REGISTRY' ENTERED AT 09:29:50 ON 16 AUG 2010
L4 16 SEA SPE=ON ABB=ON PLU=ON (435293-93-9/BI OR 7439-98-7/BI

FILE 'HCAPLUS' ENTERED AT 09:33:13 ON 16 AUG 2010
SEL L3 AU
L5 153 SEA SPE=ON ABB=ON PLU=ON ("GERHARD, ANJA"/AU OR
"STOESSEL, PHILIPP"/AU OR "VESTWEBER, HORST"/AU)
E MERCK/CO
L6 42517 SEA SPE=ON ABB=ON PLU=ON (MERCK+ALL/CO,CS,PA OR "MERCK"
L7 24168 SEA SPE=ON ABB=ON PLU=ON ("MERCK INST"+ALL/CO,CS,PA OR
L8 12827 SEA SPE=ON ABB=ON PLU=ON ("MERCK SERONO ANALYTICAL
L9 45049 SEA SPE=ON ABB=ON PLU=ON (L6 OR L7 OR L8)
L10 214161 SEA SPE=ON ABB=ON PLU=ON (ELECTROLUM!N? OR ORGANOLUM!N?
OR (ELECTRO OR ORGANO OR ORG#) (2A)LUM!N? OR LIGHT?(2A)(EMIT
? OR EMISSION?) OR EL OR E(W)L OR L(W)E(W)D OR OLED)/BI,AB
OR LED/IT
L11 2614 SEA SPE=ON ABB=ON PLU=ON HOLE? (2A) BLOCK?
L12 1081 SEA SPE=ON ABB=ON PLU=ON L10 AND L11

FILE 'REGISTRY' ENTERED AT 09:50:53 ON 16 AUG 2010
L13 TRA PLU=ON L10 1- RN : 50344 TERMS
L14 50344 SEA SPE=ON ABB=ON PLU=ON L13

FILE 'LREGISTRY' ENTERED AT 10:07:03 ON 16 AUG 2010
L15 STR

FILE 'REGISTRY' ENTERED AT 10:10:55 ON 16 AUG 2010
L16 50 SEA SUB=L14 SSS SAM L15
L17 5957 SEA SUB=L14 SSS FUL L15
L18 1348973 SEA SPE=ON ABB=ON PLU=ON PMS/CI
L19 4863 SEA SPE=ON ABB=ON PLU=ON L17 NOT L18

FILE 'HCAPLUS' ENTERED AT 10:15:13 ON 16 AUG 2010
L20 4934965 SEA SPE=ON ABB=ON PLU=ON L19
L21 19741 SEA SPE=ON ABB=ON PLU=ON L20 AND L10
L22 24567 SEA SPE=ON ABB=ON PLU=ON PHOSPHORESC?
L23 848 SEA SPE=ON ABB=ON PLU=ON L21 AND L22
L24 2614 SEA SPE=ON ABB=ON PLU=ON HOLE? (2A) BLOCK?
L25 44 SEA SPE=ON ABB=ON PLU=ON L23 AND L24
L26 QUE SPE=ON ABB=ON PLU=ON BLOCKER? OR BLOCKING?
L27 54 SEA SPE=ON ABB=ON PLU=ON L23 AND L26
L28 54 SEA SPE=ON ABB=ON PLU=ON L25 OR L27

August 16, 2010

10/581,005

2

L29 5 SEA SPE=ON ABB=ON PLU=ON L28 AND (L5 OR L9)
L30 49 SEA SPE=ON ABB=ON PLU=ON L28 NOT L29
L31 6 SEA SPE=ON ABB=ON PLU=ON 1808-2003/PY,PRY,AY AND L30

FILE 'REGISTRY' ENTERED AT 11:25:31 ON 16 AUG 2010
L32 TRA PLU=ON L10 1- RN : 50344 TERMS
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L34 TRA PLU=ON L10 17724- RN : 50441 TERMS
L35 50441 SEA SPE=ON ABB=ON PLU=ON L34
L36 TRA PLU=ON L10 29850- RN : 50331 TERMS
L37 50330 SEA SPE=ON ABB=ON PLU=ON L36
L38 TRA PLU=ON L10 62259- RN : 50310 TERMS
L39 50310 SEA SPE=ON ABB=ON PLU=ON L38
L40 TRA PLU=ON L10 95581- RN : 50058 TERMS
L41 50058 SEA SPE=ON ABB=ON PLU=ON L40
L42 TRA PLU=ON L10 122529- RN : 50729 TERMS
L43 50729 SEA SPE=ON ABB=ON PLU=ON L42
L44 TRA PLU=ON L10 138684- RN : 50172 TERMS
L45 50172 SEA SPE=ON ABB=ON PLU=ON L44
L46 TRA PLU=ON L10 159547- RN : 50301 TERMS
L47 50301 SEA SPE=ON ABB=ON PLU=ON L46

FILE 'HCAPLUS' ENTERED AT 12:56:51 ON 16 AUG 2010
L48 TRA PLU=ON L10 206698- RN : 8275 TERMS

FILE 'REGISTRY' ENTERED AT 12:58:26 ON 16 AUG 2010
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L41 OR L43 OR L45 OR L47 OR L49
L51 50 SEA SUB=L50 SSS SAM L15
L52 59833 SEA SUB=L50 SSS FUL L15
SAV L52 CLA005/A
L53 59832 SEA SPE=ON ABB=ON PLU=ON L52/COM
L54 48759 SEA SPE=ON ABB=ON PLU=ON L53 NOT L18

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L55 QUE SPE=ON ABB=ON PLU=ON L54
L56 26804 SEA SPE=ON ABB=ON PLU=ON L10 AND L55
L57 15430 SEA SPE=ON ABB=ON PLU=ON L54 (L) L26
L58 84 SEA SPE=ON ABB=ON PLU=ON L56 AND L57
L59 15 SEA SPE=ON ABB=ON PLU=ON L58 AND L22
L60 469 SEA SPE=ON ABB=ON PLU=ON L56 AND L26
L61 70 SEA SPE=ON ABB=ON PLU=ON L60 AND L22
L62 5 SEA SPE=ON ABB=ON PLU=ON L61 AND (L5 OR L9)
L63 65 SEA SPE=ON ABB=ON PLU=ON L61 NOT L62
L64 10 SEA SPE=ON ABB=ON PLU=ON 1808-2003/PY,PRY,AY AND L63

FILE 'REGISTRY' ENTERED AT 13:08:44 ON 16 AUG 2010

=> D L52 QUE STAT
L10 214161 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON (ELECTROLUM!N? OR
ORGANOLUM!N? OR (ELECTRO OR ORGANO OR ORG#) (2A)LUM!N? OR
LIGHT?(2A)(EMIT? OR EMISSION?) OR EL OR E(W)L OR L(W)E(W)D
OR OLED)/BI,AB OR LED/IT
L15 STR

$\begin{matrix} G1 \\ 1 \end{matrix} \equiv \begin{matrix} G2 \\ 2 \end{matrix}$

VAR G1=C/S/P
 VAR G2=O/S
 NODE ATTRIBUTES:
 DEFAULT MLEVEL IS ATOM
 DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:
 RING(S) ARE ISOLATED OR EMBEDDED
 NUMBER OF NODES IS 2

STEREO ATTRIBUTES: NONE

L32	TRANSFER	PLU=ON	L10 1-	RN :	50344	TERMS
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L34	TRANSFER	PLU=ON	L10 17724-	RN :	50441	TERMS
L35	50441	SEA FILE=REGISTRY	SPE=ON	ABB=ON	PLU=ON	L34
L36	TRANSFER	PLU=ON	L10 29850-	RN :	50331	TERMS
L37	50330	SEA FILE=REGISTRY	SPE=ON	ABB=ON	PLU=ON	L36
L38	TRANSFER	PLU=ON	L10 62259-	RN :	50310	TERMS
L39	50310	SEA FILE=REGISTRY	SPE=ON	ABB=ON	PLU=ON	L38
L40	TRANSFER	PLU=ON	L10 95581-	RN :	50058	TERMS
L41	50058	SEA FILE=REGISTRY	SPE=ON	ABB=ON	PLU=ON	L40
L42	TRANSFER	PLU=ON	L10 122529-	RN :	50729	TERMS
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L44	TRANSFER	PLU=ON	L10 138684-	RN :	50172	TERMS
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L46	TRANSFER	PLU=ON	L10 159547-	RN :	50301	TERMS
L47	50301	SEA FILE=REGISTRY	SPE=ON	ABB=ON	PLU=ON	L46
L48	TRANSFER	PLU=ON	L10 206698-	RN :	8275	TERMS
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L50	327725	SEA FILE=REGISTRY	SPE=ON	ABB=ON	PLU=ON	L33 OR L35 OR L37 OR L39 OR L41 OR L43 OR L45 OR L47 OR L49
L52	59833	SEA FILE=REGISTRY	SUB=L50	SSS FUL	L15	

100.0% PROCESSED 156321 ITERATIONS (1 INCOMPLETE) 59833 ANSWERS
 SEARCH TIME: 00.00.01

=> FIL HCAP
 FILE 'HCAPLUS' ENTERED AT 13:08:59 ON 16 AUG 2010
 USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.
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=> D L62 1-5 IBIB ABS HITSTR HITIND RETABLE

L62 ANSWER 1 OF 5 HCAPLUS COPYRIGHT 2010 ACS on STN
 ACCESSION NUMBER: 2010:629008 HCAPLUS Full-text
 DOCUMENT NUMBER: 152:592160

TITLE: Group IVA element arylamido complexes as materials for organic electroluminescent devices

INVENTOR(S): Stoessel, Philipp; Heil, Holger; Joosten, Dominik; Pflumm, Christof; Gerhard, Anja

PATENT ASSIGNEE(S): Merck Patent G.m.b.H., Germany

SOURCE: PCT Int. Appl., 77pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 3

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2010054729	A2	20100520	WO 2009-EP7361	20091014
W: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW	RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM			
DE 102008056688	A1	20100512	DE 2008-102008056688	20081111
PRIORITY APPLN. INFO.:			DE 2008-102008056688A	20081111

OTHER SOURCE(S): MARPAT 152:592160

AB Group IVA element compds., $M[R2N-R1A-R1B(R1D-R1E)qY]mR44-2m$ [1, M = Si, Ge, Sn, Ti, Zr, Hf, preferably M = Si; R4 = alkyl, aryl; m = 1, 2; q = 0, 1; A, B, D, E = double- or single-bonded carbon, A-B and/or E-Y may be a part of an aromatic ring; Y = amino, O, S; R1 = H, halo, CN, NO₂, amino, C1-40 alkyl, alkoxy, alkylthio, alkenyl, (hetero)aryl, aryloxy; R2 = alkyl, cycloalkyl, (hetero)aryl], complexes $M[R2N-R1A-R1B(R1D-R1E)qY]mR46-2m$ (M = Cr, Mo, W) preferably compds. 1 are non-porphyrinato or porphyrinato-like, useful as electron- or exciton-blocking matrix materials for light-emitting layers of electroluminescent devices, were prepared (M = Si) by reaction of the corresponding deprotonated amines with Si precursors SiCl₄, R₄SiCl₂ and tested as additives for electron-blocking layers and light-emitting layers (3-30%), which substantially increased efficiency of phosphorescent substances, such as tris(phenylpyridine)iridium. In an example, reaction of 300 mmol of the diamine Q(NHAr)₂ (Q = 1,2-C₆H₄, 4,5-Me₂-1,2-C₆H₂, 1,1'-biphenyl-2,2-diyl; Ar = Ph, MeC₆H₄, PhC₆H₄) with 600 mmol of BuLi in 2 L of Et₂O followed by addition of 150 mmol of SiCl₄ gave compds. 1, Si[Q(NAr₂)₂]₂ (1a, same Q, Ar) with 27-61% yields. In another example, an organic light-emitting device (OLED), having the compound 1, Si[1,2-C₆H₄(NPh)₂]₂ (1b) as a electron-blocking layer and as a dopant to light-emitting layer, consisting of bis(1,1':3',1'':3'',1'''':3''',1'''''-quinquephenyl-5''-yl)methanone (M1), doped with 10% of 1b and 10% of tris(2-phenylpyridine)iridium, showed an efficiency of 54 cd/A, compared to 32.8 cd/A for similar device without 1b.

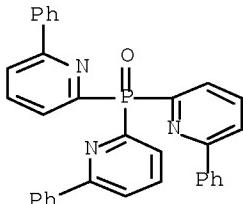
IT 197776-46-8, Tris(6-phenyl-2-pyridinyl)phosphine oxide
1205555-94-7

(preparation of silicon chelate tetramides and diorganosilane diamides as additives for electron- and exciton-blocking layers,

dopants for OLED light-emitting layers)

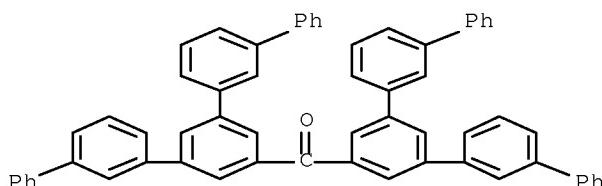
RN 197776-46-8 HCPLUS

CN Pyridine, 2,2',2''-phosphinylidynetris[6-phenyl- (9CI) (CA INDEX NAME)



RN 1205555-94-7 HCPLUS

CN Methanone, bis([1,1':3',1'':3'',1'''':3''',1''''-quinquephenyl]-5''-yl) - (CA INDEX NAME)



IPCI C09K0011-06 [I,A]

IPCR C09K0011-06 [I,C]; C09K0011-06 [I,A]

CC 29-6 (Organometallic and Organometalloidal Compounds)
Section cross-reference(s): 73, 76

ST silicon amide arylamine prepn electron exciton blocking dopant OLED; chelate silicon tetramido arylamine complex prepn electroluminescent device dopant; electroluminescent device efficiency improvement silicon tetramido complex

IT Amines
(aryl, silicon complexes; preparation of silicon chelate tetramides and diorganosilane diamides as additives for electron- and exciton-blocking layers, dopants for OLED light-emitting layers)

IT Amines
(diamines, aromatic, silicon complexes; preparation of silicon chelate tetramides and diorganosilane diamides as additives for electron- and exciton-blocking layers, dopants for OLED light-emitting layers)

IT Electrochemical cells
(light-emitting, organic; preparation of silicon chelate tetramides and diorganosilane diamides as additives for electron- and exciton-blocking layers, dopants for OLED light-emitting layers)

IT Plasmon
(organic plasmon-emitting devices; preparation of silicon chelate

- tetramides and diorganosilane diamides as additives for electron- and exciton-blocking layers, dopants for OLED light-emitting layers)
- IT Field effect transistors
Optical detectors
Optical integrated circuits
Semiconductor lasers
Solar cells
Thin film transistors
(organic; preparation of silicon chelate tetramides and diorganosilane diamides as additives for electron- and exciton-blocking layers, dopants for OLED light-emitting layers)
- IT Deprotonation
Electroluminescent devices
Electrophotographic photoconductors (photoreceptors)
Phosphorescent substances
(preparation of silicon chelate tetramides and diorganosilane diamides as additives for electron- and exciton-blocking layers, dopants for OLED light-emitting layers)
- IT Group IVA element compounds
(preparation of silicon chelate tetramides and diorganosilane diamides as additives for electron- and exciton-blocking layers, dopants for OLED light-emitting layers)
- IT Chelates
(silicon; preparation of silicon chelate tetramides and diorganosilane diamides as additives for electron- and exciton-blocking layers, dopants for OLED light-emitting layers)
- IT 1206465-62-4P 1225231-03-7P 1225231-04-8P 1225231-05-9P
(preparation of silicon chelate tetramides and diorganosilane diamides as additives for electron- and exciton-blocking layers, dopants for OLED light-emitting layers)
- IT 2085-33-8, Tris(8-quinolinolato)aluminum 50926-11-9, Indium tin oxide 123847-85-8 126213-51-2,
Poly(3,4-ethylenedioxy-2,5-thiophene) 197776-46-8,
Tris(6-phenyl-2-pyridinyl)phosphine oxide 359014-71-4 376367-93-0
613682-85-2 693794-98-8 1205555-94-7 1227140-78-4
1227140-79-5
(preparation of silicon chelate tetramides and diorganosilane diamides as additives for electron- and exciton-blocking layers, dopants for OLED light-emitting layers)
- IT 62-53-3, Aniline, reactions 75-78-5, Dichlorodimethylsilane
80-10-4, Dichlorodiphenylsilane 92-67-1, [1,1'-Biphenyl]-4-amine
106-49-0, p-Toluidine, reactions 108-44-1, m-Toluidine, reactions
134-32-7, 1-Naphthalenamine 583-53-9, 1,2-Dibromobenzene
2243-47-2, [1,1'-Biphenyl]-3-amine 13029-09-9 15810-15-8,
9,10-Dibromophenanthrene 18030-58-5, 9,9-Dichloro-9-silafluorene
24932-48-7
(preparation of silicon chelate tetramides and diorganosilane diamides as additives for electron- and exciton-blocking layers, dopants for OLED light-emitting layers)
- IT 28394-83-4P 29325-52-8P 147850-52-0P 253334-40-6P 956471-82-2P
1225230-99-8P 1225231-00-4P 1225231-01-5P 1225231-02-6P
(preparation of silicon chelate tetramides and diorganosilane diamides

as additives for electron- and exciton-blocking layers,
dopants for OLED light-emitting
layers)

IT 1225231-06-0P 1225231-07-1P 1225231-08-2P 1225231-09-3P
1225231-10-6P 1227140-75-1P 1227140-76-2P 1227140-77-3P
(preparation of silicon chelate tetramides and diorganosilane diamides
as additives for electron- and exciton-blocking layers,
dopants for OLED light-emitting
layers)

L62 ANSWER 2 OF 5 HCPLUS COPYRIGHT 2010 ACS on STN

ACCESSION NUMBER: 2010:621353 HCPLUS Full-text

DOCUMENT NUMBER: 152:592162

TITLE: Cyclic arylphosphonic acid derivatives as
supplementary materials for organic
electroluminescent devices

INVENTOR(S): Stoessel, Philipp; Heil, Holger;
Joosten, Dominik; Pflumm, Christof; Gerhard,
Anja; Breuning, Esther; Parham, Amir Hossain

PATENT ASSIGNEE(S): Merck Patent GmbH, Germany

SOURCE: PCT Int. Appl., 101pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 3

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2010054730	A1	20100520	WO 2009-EP7406	20091015
W: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW				
RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
DE 102008056688	A1	20100512	DE 2008-102008056688	20081111
PRIORITY APPLN. INFO.:			DE 2008-102008056688A	20081111
			DE 2009-102009022858A	20090527

OTHER SOURCE(S): MARPAT 152:592162

AB Phosphorus heterocyclic compds., preferably diazaphosphole, oxazaphosphole
oxides, sulfides [QZ2P(X)]nAr (1, Q = benzo, areno, hetareno, substituted 1,2-
ethenediyl, etc.; Z = imino, O, S; X = O, S, preferably X = O; Ar = C6-60
aryl, arylene; n = 1-6, preferably n = 1-3), useful as matrix and/or
supplementary materials for organic electroluminescent devices (OLEDs),
preferably for blue- and green-emitting OLEDs, based on phosphorescent
transition metal complexes, improving performance, efficiency and lifetime of
the OLEDs, for making of emitting, electron-, exciton-, or hole-blocking
layers, were prepared by heterocyclization of aromatic o-diamines, o-
aminophenols Q(AH)2 with phosphonic dichlorides Ar[P(X)Cl2]n, which, in turn
were prepared from the corresponding arylphosphonic, arenediphosphonic and

arenetriphosphonic acids. The prepared compds. were tested in model OLEDs by doping the emission and hole-blocking layers, showing increase of efficiency and lifetime of the devices. In an example, 2,2'-(1,4-phenylene)bis(5,6-dimethyl-1,3-diphenyl[1,3,2]benzophosphole) P,P'-dioxide (1a, Q = 4,5-dimethylbenzene-1,2-diyl, Z = NPh, X = O, n = 2, Ar = 1,4-C₆H₄) was prepared by heterocyclization of 4,5-dimethyl-N,N'-diphenyl-1,2-benzenediamine with 1,4-benzenediphosphonic tetrachloride, Cl₂P(O)-1,4-C₆H₄P(O)Cl₂. In another example, the compound 1a, as matrix material doped with 10% tris(3-methyl-2-phenylpyridine)iridium for 30 nm-thick light-emitting layer, showed 57 cd/A efficiency at 1000 cd m⁻² light d. and 560 h lifetime at 4000 cd m⁻² light d., compared with 42 cd/A and 230 h for similar device using bis(9,9'-spirobifluoren-2-yl)phenylphosphine oxide as matrix material.

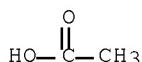
IT 3375-31-3 78271-46-2, Phosphonic acid,

1,3-phenylenebis-

(preparation of cyclic arylphosphonic acid derivs., benzo[1,3,2]-diazaphosphole oxides as supplementary materials for organic electroluminescent devices)

RN 3375-31-3 HCPLUS

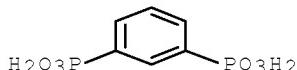
CN Acetic acid, palladium(2+) salt (2:1) (CA INDEX NAME)



●1/2 Pd(II)

RN 78271-46-2 HCPLUS

CN Phosphonic acid, P,P'-1,3-phenylenebis- (CA INDEX NAME)

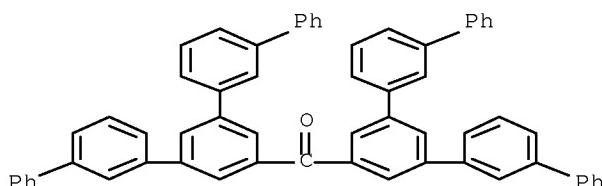


IT 1205555-94-7

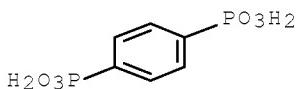
(preparation of cyclic arylphosphonic acid derivs., benzo[1,3,2]-diazaphosphole oxides as supplementary materials for organic electroluminescent devices)

RN 1205555-94-7 HCPLUS

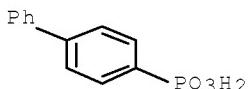
CN Methanone, bis([1,1':3',1'':3'',1''':3''',1''''-quinquephenyl]-5''-yl)-(CA INDEX NAME)



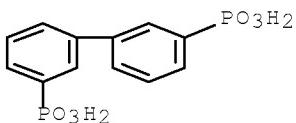
IT 880-68-2, Phosphonic acid, 1,4-phenylenebis-
 77918-47-9, Phosphonic acid, 1,1'-biphenyl-4-yl-
 108724-77-2, Phosphonic acid, 1,1'-biphenyl-3,3'-diylbis-
 (preparation of cyclic arylphosphonic acid derivs.,
 benzo[1,3,2]-diazaphosphole oxides as supplementary materials for
 organic electroluminescent devices)
 RN 880-68-2 HCPLUS
 CN Phosphonic acid, P,P'-1,4-phenylenebis- (CA INDEX NAME)



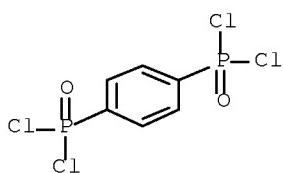
RN 77918-47-9 HCPLUS
 CN Phosphonic acid, P-[1,1'-biphenyl]-4-yl- (CA INDEX NAME)



RN 108724-77-2 HCPLUS
 CN Phosphonic acid, P,P'-[[1,1'-biphenyl]-3,3'-diyl]bis- (CA INDEX NAME)



IT 1227269-53-5P, 1,4-Benzenediphosphonic tetrachloride
 (preparation of cyclic arylphosphonic acid derivs.,
 benzo[1,3,2]-diazaphosphole oxides as supplementary materials for
 organic electroluminescent devices)
 RN 1227269-53-5 HCPLUS
 CN Phosphonic dichloride, P,P'-1,4-phenylenebis- (CA INDEX NAME)

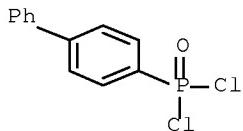


IT 77918-51-5P 1227269-76-2P
 1227269-77-3P

(preparation of cyclic arylphosphonic acid derivs.,
 benzo[1,3,2]-diazaphosphole oxides as supplementary materials for
 organic **electroluminescent** devices)

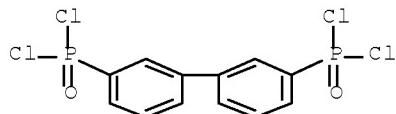
RN 77918-51-5 HCPLUS

CN Phosphonic dichloride, P-[1,1'-biphenyl]-4-yl- (CA INDEX NAME)



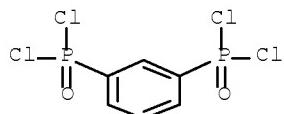
RN 1227269-76-2 HCPLUS

CN Phosphonic dichloride, P,P'-[1,1'-biphenyl]-3,3'-diylbis- (CA INDEX NAME)



RN 1227269-77-3 HCPLUS

CN Phosphonic dichloride, P,P'-1,3-phenylenebis- (CA INDEX NAME)



IPCI C09K0011-06 [I,A]

IPCR C09K0011-06 [I,C]; C09K0011-06 [I,A]

CC 29-7 (Organometallic and Organometalloidal Compounds)

Section cross-reference(s): 73, 76

ST diazaphosphole oxazaphosphole oxide arylphosphonic deriv prep matrix material OLED; phosphorus heterocyclic phosphonic diamide aryl prep matrix material OLED; phosphonic deriv cyclic material OLED matrix hole blocking; heterocyclization arom amine arylphosphonic dichloride diazaphosphole oxazaphosphole prep

IT Diphosphonates

Phosphonates

(arylphosphonate derivs.; preparation of cyclic arylphosphonic acid derivs., benzo[1,3,2]-diazaphosphole oxides as supplementary materials for organic **electroluminescent** devices)

- IT Electroluminescent devices
(blue-emitting; preparation of cyclic arylphosphonic acid derivs., benzo[1,3,2]-diazaphosphole oxides as supplementary materials for organic electroluminescent devices)
- IT Amines
(diamines, aromatic; preparation of cyclic arylphosphonic acid derivs., benzo[1,3,2]-diazaphosphole oxides as supplementary materials for organic electroluminescent devices)
- IT Electroluminescent devices
(green-emitting; preparation of cyclic arylphosphonic acid derivs., benzo[1,3,2]-diazaphosphole oxides as supplementary materials for organic electroluminescent devices)
- IT Electrochemical cells
(light-emitting; preparation of cyclic arylphosphonic acid derivs., benzo[1,3,2]-diazaphosphole oxides as supplementary materials for organic electroluminescent devices)
- IT Plasmon
(organic plasmon emitting devices; preparation of cyclic arylphosphonic acid derivs., benzo[1,3,2]-diazaphosphole oxides as supplementary materials for organic electroluminescent devices)
- IT Field effect transistors
Integrated circuits
Optical detectors
Semiconductor lasers
Solar cells
Thin film transistors
(organic; preparation of cyclic arylphosphonic acid derivs., benzo[1,3,2]-diazaphosphole oxides as supplementary materials for organic electroluminescent devices)
- IT Heterocyclic compounds
(phosphorus, 1,3,2-diazaphosphole 2-oxides; preparation of cyclic arylphosphonic acid derivs., benzo[1,3,2]-diazaphosphole oxides as supplementary materials for organic electroluminescent devices)
- IT Electrophotographic photoconductors (photoreceptors)
Heterocyclization
(preparation of cyclic arylphosphonic acid derivs., benzo[1,3,2]-diazaphosphole oxides as supplementary materials for organic electroluminescent devices)
- IT 3375-31-3 13716-12-6, Tri-tert-butylphosphine
78271-46-2, Phosphonic acid, 1,3-phenylenebis-
(preparation of cyclic arylphosphonic acid derivs., benzo[1,3,2]-diazaphosphole oxides as supplementary materials for organic electroluminescent devices)
- IT 1227269-57-9P 1227269-58-0P 1227269-59-1P 1227269-60-4P
1227269-61-5P 1227269-62-6P 1227269-63-7P 1227269-79-5P
(preparation of cyclic arylphosphonic acid derivs., benzo[1,3,2]-diazaphosphole oxides as supplementary materials for organic electroluminescent devices)
- IT 2085-33-8, Tris(8-quinolinolato)aluminum 25387-93-3,
(8-Quinolinolato)lithium 50926-11-9, Indium tin oxide 58328-31-7
105598-27-4 123847-85-8, 1,1'-Biphenyl-4-4'-diamine,
N,N'-di-1-naphthalenyl-N,N'-diphenyl- 126213-51-2, PEDOT
164724-35-0 359014-71-4 435294-03-4 515834-67-0 561064-11-7
613682-85-2 1205555-94-7 1206465-62-4 1207176-84-8
(preparation of cyclic arylphosphonic acid derivs., benzo[1,3,2]-diazaphosphole oxides as supplementary materials for organic electroluminescent devices)
- IT 62-53-3, Aniline, reactions 92-66-0 92-67-1,

[1,1'-Biphenyl]-4-amine 95-53-4, o-Toluidine, reactions 106-49-0,
 p-Toluidine, reactions 504-24-5, 4-Pyridinamine 534-85-0,
 1,2-Benzenediamine, N-phenyl- 583-53-9, 1,2-Dibromobenzene
 880-68-2, Phosphonic acid, 1,4-phenylenebis- 3842-55-5
 10498-56-3, 1,4-Benzenediphosphorous tetrachloride 24932-48-7
 28394-83-4, 1,2-Benzenediamine, N,N'-diphenyl- 38613-89-7,
 Phosphorous dichloride, 1,1'-biphenyl-4-yl- 77918-47-9,
 Phosphonic acid, 1,1'-biphenyl-4-yl- 82495-68-9,
 1,3-Benzene-diphosphorous tetrachloride 108724-77-2,
 Phosphonic acid, 1,1'-biphenyl-3,3'-diylbis- 1227269-78-4
 (preparation of cyclic arylphosphonic acid derivs.,
 benzo[1,3,2]-diazaphosphole oxides as supplementary materials for
 organic electroluminescent devices)

IT 64436-68-6P 253334-40-6P 773056-31-8P 956471-82-2P
 1225231-00-4P 1227269-53-5P, 1,4-Benzene-diphosphonic
 tetrachloride 1227269-54-6P 1227269-55-7P 1227269-56-8P
 1227269-73-9P 1227269-80-8P 1227269-81-9P
 (preparation of cyclic arylphosphonic acid derivs.,
 benzo[1,3,2]-diazaphosphole oxides as supplementary materials for
 organic electroluminescent devices)

IT 77918-51-5P 1227269-64-8P 1227269-65-9P 1227269-66-0P
 1227269-67-1P 1227269-68-2P 1227269-70-6P 1227269-71-7P
 1227269-72-8P 1227269-74-0P 1227269-75-1P 1227269-76-2P
 1227269-77-3P 1227269-82-0P 1227269-83-1P 1227269-84-2P
 1227269-85-3P
 (preparation of cyclic arylphosphonic acid derivs.,
 benzo[1,3,2]-diazaphosphole oxides as supplementary materials for
 organic electroluminescent devices)

RETABLE

Referenced Author (RAU)	Year VOL PG Referenced Work (R PY) (R VL) (R PG) Referenced (RWK)	Referenced File
Anchisi, C	1979 16 1439 JOURNAL OF HETEROCYC HCPLUS	
Anisimova	1976 46 807 JOURNAL OF GENERAL C	
Konica Minolta Holdings	2007 JP 2007329495 A HCPLUS	
Lister, J	1966 1242 JOURNAL OF THE CHEMI HCPLUS	
Satoshi, O	1995 41 889 HETEROCYCLES	

L62 ANSWER 3 OF 5 HCPLUS COPYRIGHT 2010 ACS on STN
 ACCESSION NUMBER: 2006:1173494 HCPLUS Full-text
 DOCUMENT NUMBER: 145:498536
 TITLE: Organic electronic devices and boronic acid and
 boronic acid derivatives used therein
 INVENTOR(S): Stoessel, Philipp; Breuning, Esther;
 Buesing, Arne; Parham, Amir; Heil, Holger;
 Vestweber, Horst
 PATENT ASSIGNEE(S): Merck Patent G.m.b.H., Germany
 SOURCE: PCT Int. Appl., 159pp.
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: German
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2006117052	A1	20061109	WO 2006-EP3150	20060406
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM,				

KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG,
 MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT,
 RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT,
 TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW
 RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU,
 IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR,
 BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD,
 TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
 ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM
 EP 1888706 A1 20080220 EP 2006-724095 20060406
 R: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU,
 IE, IS, IT, LI, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR
 JP 2008541417 T 20081120 JP 2008-509318 20060406
 US 20090134384 A1 20090528 US 2007-912939 20071029
 CN 101171320 A 20080430 CN 2006-80015401 20071105
 KR 2008012337 A 20080211 KR 2007-728263 20071203
 PRIORITY APPLN. INFO.: EP 2005-9643 A 20050503
 WO 2006-EP3150 W 20060406

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

OTHER SOURCE(S): MARPAT 145:498536

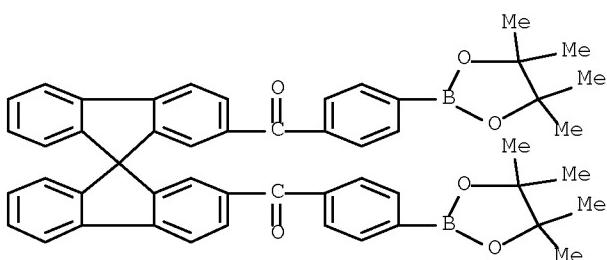
AB Organic electronic devices (e.g., organic or polymer light-emitting diodes, organic field-effect transistors, organic integrated circuits, organic thin-film transistors, organic light-emitting transistors, organic solar cells, organic field quenching devices, organic light-emitting cells, organic photoreceptors, and organic laser diodes) are described which comprise ≥1 organic film including ≥1 aromatic boronic acid or boronic acid derivative compound. The compds. may serve as fluorescent or phosphorescent dopants, as hole-blocking materials, as hole-transporting materials, or as electron-transporting materials. Oligomeric, dendrimeric, and polymeric compds. of boronic acid or boronic acid derivative compds. are also described. Methods for synthesizing polymers including boronic acid derivs. are described which entail polycondensation of aliphatic or aromatic bis(diols), bis(dithiols), bis(diamines), or similar higher substituted compds. with an aromatic bisboronic acid or higher boronic acid or by reaction of an aromatic compound that includes 2 hydroxy, thiol, or amino groups as well as a boronic acid group.

IT 914307-04-3P 914307-06-3P

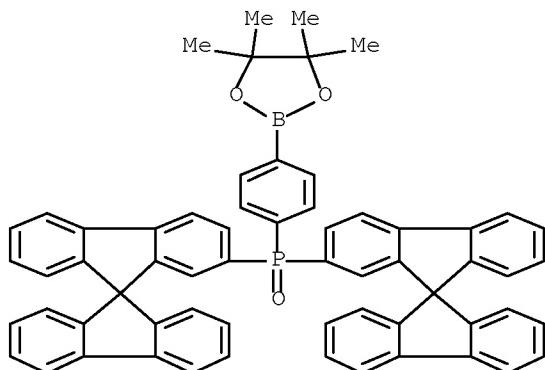
(organic electronic devices and boronic acid and boronic acid derivs. used in them and production of polymers including boronic acid-containing groups)

RN 914307-04-3 HCPLUS

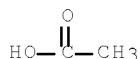
CN Methanone, 9,9'-spirobi[9H-fluorene]-2,2'-diylbis[[4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl]- (9CI) (CA INDEX NAME)



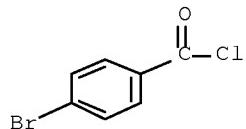
RN 914307-06-5 HCAPLUS
 CN Phosphine oxide, 9,9'-spirobi[9H-fluoren]-2-yl-9,9'-spirobi[9H-fluoren]-2'-yl[4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl]-(CA INDEX NAME)



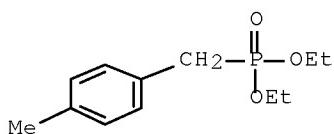
IT 64-19-7, Acetic acid, reactions 586-75-4
 3762-25-2 25069-38-9,
 Bis(4-bromophenyl)(4-formylphenyl)amine 119001-43-3
 187595-15-9
 (organic electronic devices and boronic acid and boronic acid derivs.
 used in them and production of polymers including boronic acid-containing
 groups)
 RN 64-19-7 HCAPLUS
 CN Acetic acid (CA INDEX NAME)



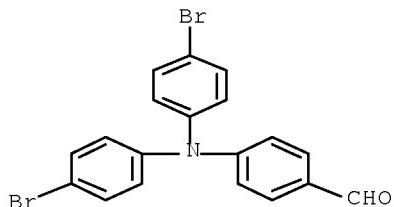
RN 586-75-4 HCAPLUS
 CN Benzoyl chloride, 4-bromo- (CA INDEX NAME)



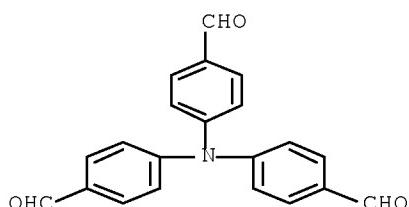
RN 3762-25-2 HCAPLUS
 CN Phosphonic acid, P-[(4-methylphenyl)methyl]-, diethyl ester (CA INDEX NAME)



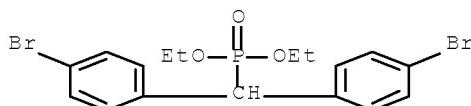
RN 25069-38-9 HCAPLUS
 CN Benzaldehyde, 4-[bis(4-bromophenyl)amino]- (CA INDEX NAME)



RN 119001-43-3 HCAPLUS
 CN Benzaldehyde, 4,4',4''-nitrilotris- (CA INDEX NAME)

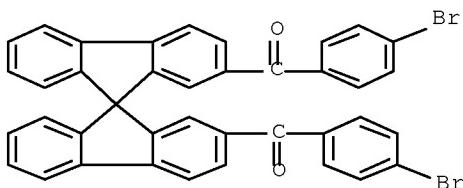


RN 187595-15-9 HCAPLUS
 CN Phosphonic acid, [bis(4-bromophenyl)methyl]-, diethyl ester (9CI) (CA INDEX NAME)



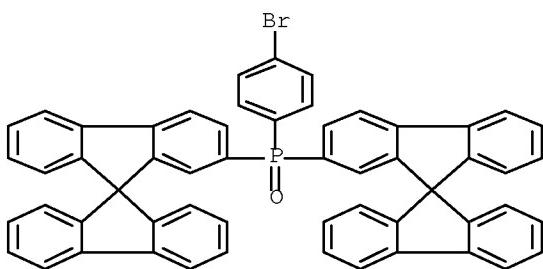
IT 914307-05-4P, 2,2'-Bis(4-bromobenzoyl)spiro-9,9'-bifluorene
 914307-07-6P
 (organic electronic devices and boronic acid and boronic acid derivs.
 used in them and production of polymers including boronic acid-containing
 groups)
 RN 914307-05-4 HCAPLUS

CN Methanone, 9,9'-spirobi[9H-fluorene]-2,2'-diylbis[(4-bromophenyl)-
(9CI) (CA INDEX NAME)



RN 914307-07-6 HCPLUS

CN Phosphine oxide, (4-bromophenyl)bis(9,9'-spirobi[9H-fluoren]-2-yl)-
(9CI) (CA INDEX NAME)



IPCI C09K0011-06 [I,A]; H05B0033-14 [I,A]; C07F0005-02 [I,A]; C07F0005-05 [I,A]; C07F0005-00 [I,C*]; C07F0015-00 [I,A]

IPCR C09K0011-06 [I,C]; C09K0011-06 [I,A]; C07F0005-00 [I,C]; C07F0005-02 [I,A]; C07F0005-05 [I,A]; C07F0015-00 [I,C]; C07F0015-00 [I,A]; H05B0033-14 [I,C]; H05B0033-14 [I,A]

CC 76-3 (Electric Phenomena)

Section cross-reference(s): 52, 73, 74

ST electronic device boronic acid compd; fluorescent boronic acid compd; phosphorescent boronic acid compd; light emitting diode boronic acid compd; field effect transistor boronic acid compd; integrated circuit boronic acid compd; thin film transistor boronic acid compd; light emitting transistor boronic acid compd; solar cell boronic acid compd; field quenching device boronic acid compd; light emitting cell boronic acid compd; photoreceptor boronic acid compd; laser diode boronic acid compd

IT Electrical materials

Fluorescent substances

Phosphorescent substances

Thin film transistors

(organic electronic devices and boronic acid and boronic acid derivs. used in them and production of polymers including boronic acid-containing groups)

IT Transistors

(organic light-emitting; organic electronic devices and boronic acid and boronic acid derivs. used in them and production of polymers including boronic acid-containing groups)

- IT Electroluminescent devices
 Electrophotographic photoconductors (photoreceptors)
 Field effect transistors
 Integrated circuits
 Semiconductor devices
 Semiconductor lasers
 Solar cells
 (organic; organic electronic devices and boronic acid and boronic acid derivs. used in them and production of polymers including boronic acid-containing groups)
- IT 910244-23-4P 914306-83-5P, 10-(4-Methylnaphth-1-yl)anthracen-9-boronic acid pinacol ester 914306-84-6P 914306-85-7P
 914306-86-8P 914306-88-0P 914306-90-4P 914306-91-5P
 914306-94-8P 914306-95-9P 914306-96-0P 914306-97-1P
 914306-98-2P 914307-03-2P 914307-04-3P
 914307-06-5P 914307-08-7P 914307-09-8P 914307-11-2P
 (organic electronic devices and boronic acid and boronic acid derivs. used in them and production of polymers including boronic acid-containing groups)
- IT 64-19-7, Acetic acid, reactions 83-53-4,
 1,4-Dibromonaphthalene 84-65-1, Anthraquinone 90-11-9,
 1-Bromonaphthalene 120-80-9, Pyrocatechol, reactions 121-43-7,
 Trimethyl borate 128-08-5, N-Bromosuccinimide 159-66-0,
 Spiro-9,9'-bifluorene 523-27-3, 9,10-Dibromoanthracene 583-53-9,
 1,2-Dibromobenzene 586-75-4 611-24-5,
 2-Methylaminophenol 620-93-9, Bis(4-methylphenyl)amine 633-70-5,
 2,6-Dibromoanthraquinone 918-21-8 1564-64-3, 9-Bromoanthracene 3762-25-2 7726-95-6, Bromine, reactions 15546-43-7,
 N,N,N',N'-Tetraphenylbenzidine 25015-63-8, Pinacolborane 25069-38-9, Bis(4-bromophenyl)(4-formylphenyl)amine
 58328-31-7 85199-06-0, 2,5-Dimethylphenylboronic acid 100622-34-2,
 9-Anthracene boronic acid 113040-41-8, Dibromopyrene 119001-43-3 187595-15-9 454454-92-3
 613682-84-1 914306-87-9 914450-89-8
 (organic electronic devices and boronic acid and boronic acid derivs. used in them and production of polymers including boronic acid-containing groups)
- IT 70430-42-1P 99372-95-9P 103986-53-4P 113664-24-7P,
 N,N,N',N'-Tetra(4-bromophenyl)benzidine 177799-11-0P 426218-39-5P,
 9,10-Bis(4-bromonaphth-1-yl)anthracene 560107-57-5P,
 1,2-Bis(anthracen-9-yl)benzene 597570-70-2P 663954-33-4P,
 1,6-Bis[(4-methylphenyl)amino]pyrene 756899-77-1P,
 1,4-Bis(anthracen-9-yl)naphthalene 910244-27-8P,
 1,2-Bis(10-bromoanthracen-9-yl)benzene 912483-18-2P 912483-19-3P
 914306-89-1P, 2,6-Dibromo-9,10-bis(naphth-1-yl)anthracene
 914306-92-6P, 1,6-Bis(2,5-dimethylphenyl)pyrene 914306-93-7P,
 1,6-Bis(2,5-dimethylphenyl)-3,8-dibromopyrene 914307-00-9P
 914307-02-1P 914307-05-4P,
 2,2'-Bis(4-bromobenzoyl)spiro-9,9'-bifluorene 914307-07-6P
 914307-10-1P, 1,6-Bis[(4-methylphenyl)amino]-3,8-dibromopyrene
 914307-12-3P, 9,10-Bis-N,N-[di(4-bromophenyl)amino]anthracene
 (organic electronic devices and boronic acid and boronic acid derivs. used in them and production of polymers including boronic acid-containing groups)

RETABLE

Referenced Author (RAU)	Year VOL PG	Referenced Work (RPG)	Referenced (RWK)	File
Amann, N	2002 8 4877	CHEMISTRY, A EUROPEA	HCPLUS	
Amann, N	2002 687	SYNLETT		HCPLUS

Anon	2003	2003		PATENT ABSTRACTS OF
Anon	2003	2003		PATENT ABSTRACTS OF
Baumgarten, M	2000	104	1130	JOURNAL OF PHYSICAL HCAPLUS
Beinhoff, M	2001		3819	EUROPEAN JOURNAL OF HCAPLUS
Buettelmann, B	2003			US 2003229096 A1 HCAPLUS
Chisso Corporation	2001			EP 1142895 A HCAPLUS
Chow, H	2002	85	3444	HELVETICA CHIMICA AC HCAPLUS
Chow, H	2001	66	5042	JOURNAL OF ORGANIC C HCAPLUS
Covion Organic Semicond	2002			WO 02051850 A HCAPLUS
Covion Organic Semicond	2002			WO 02052661 A
Eastman Kodak Company	2005			WO 2005020283 A HCAPLUS
Finocchiaro, P	1973	95	7029	JOURNAL OF THE AMERI HCAPLUS
Goswami, A	2004		2635	EUROPEAN JOURNAL OF HCAPLUS
Ishikura, M	1985	23	2375	HETEROCYCLES HCAPLUS
Ishiyama, T	1997	201	92	SPECIAL PUBLICATION HCAPLUS
Kaupp, G	2003	9	4156	CHEMISTRY, A EUROPEA HCAPLUS
Ken-Tsung, W	2002	67	1041	JOURNAL OF ORGANIC C
Koch, K	1991	124	2091	CHEMISCHE BERICHTE HCAPLUS
Koei Chem Co Ltd	2004			JP 2004189705 A HCAPLUS
Konica Corp	2003			JP 2003031368 A HCAPLUS
Lg Chem Ltd	2003			WO 03095445 A HCAPLUS
Michels, J	2003	9	6167	CHEMISTRY, A EUROPEA HCAPLUS
Modrakowski, C	2001		2143	SYNTHESIS HCAPLUS
Ramsey, B	2005	690	1962	JOURNAL OF ORGANOMET HCAPLUS
Tirapattur, S	2002	106	18959	JOURNAL OF PHYSICAL
Treacher, K	2004			US 2004260090 A1 HCAPLUS
Tsung, W	2004			US 2004147742 A1
Universal Display Corpo	2003			WO 03033617 A
Wei-Bo, W	2002			US 2002019527 A1
Wong, K	2002	124	11576	JOURNAL OF THE AMERI HCAPLUS
Yamashita, M	2000	39	14055	ANGEWANDTE CHEMIE IN HCAPLUS

OS.CITING REF COUNT: 3 THERE ARE 3 CAPLUS RECORDS THAT CITE THIS RECORD (6 CITINGS)

L62 ANSWER 4 OF 5 HCAPLUS COPYRIGHT 2010 ACS on STN
 ACCESSION NUMBER: 2005:523578 HCAPLUS Full-text
 DOCUMENT NUMBER: 143:50534
 TITLE: Organic electroluminescent element
 INVENTOR(S): Westweber, Horst; Gerhard, Anja
 ; Stoessel, Philipp
 PATENT ASSIGNEE(S): Covion Organic Semiconductors G.m.b.H.,
 Germany
 SOURCE: PCT Int. Appl., 28 pp.
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: German
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	-----
WO 2005054403	A1	20050616	WO 2004-EP13312	20041124
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW				
RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW,				

AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ,
 DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LU, MC, NL,
 PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN,
 GQ, GW, ML, MR, NE, SN, TD, TG
 DE 10357315 A1 20050707 DE 2003-10357315 20031205
 EP 1697483 A1 20060906 EP 2004-798062 20041124
 R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC,
 PT, IE, SI, FI, RO, CY, TR, BG, CZ, EE, HU, PL, SK, IS
 CN 1894358 A 20070110 CN 2004-80036011 20041124
 JP 2007522645 T 20070809 JP 2006-541841 20041124
 US 20070134510 A1 20070614 US 2006-581005 20060526
 KR 2006113939 A 20061103 KR 2006-710957 20060603
 PRIORITY APPLN. INFO.: DE 2003-10357315 A 20031205
 WO 2004-EP13312 W 20041124

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

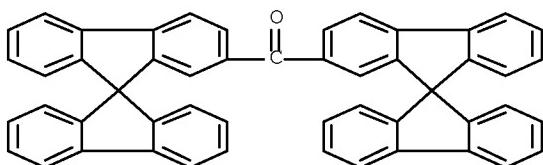
OTHER SOURCE(S): MARPAT 143:50534

AB Organic electroluminescent devices comprising an anode, a cathode, ≥ 1 emitting layer, which consists of ≥ 1 matrix material which is doped with ≥ 1 phosphorescent emitter, and ≥ 1 hole-blocking layer are described which employ compds. including units described by the general formula Y:X (X has ≥ 1 nonbonded electron pair and is selected from NR, O, S, Se, or Te; R = C1-22 organic residue, OH, OR, NH₂ NHR', and NR'2; R' = H or C1-20 organic residue; and Y = C, P, As, Sb, Bi, S, Se, or Te) as the hole-blocking material, the material being selected so that the hole-blocking and matrix materials are not identical. The use of the compds. in other electronic devices, including organic field-effect and thin-film transistors, organic integrated circuits, organic solar cells, or organic laser diodes is also described, as are the devices.

IT 782504-07-8 782504-10-3 824426-27-9
 (devices with hole-blocking materials incorporating double bonded structural units)

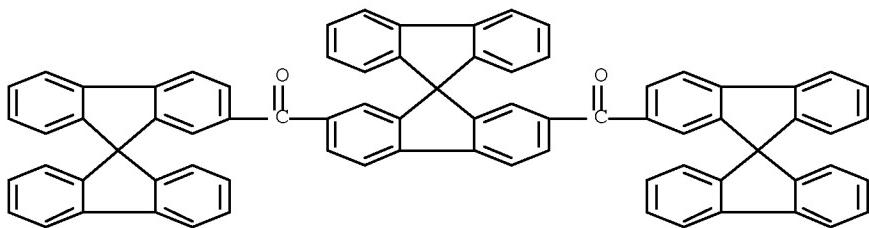
RN 782504-07-8 HCPLUS

CN Methanone, bis(9,9'-spirobi[9H-fluoren]-2-yl)- (CA INDEX NAME)



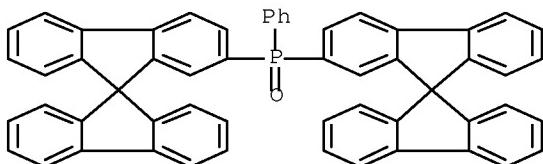
RN 782504-10-3 HCPLUS

CN Methanone, 9,9'-spirobi[9H-fluorene]-2,7-diylbis[9,9'-spirobi[9H-fluoren]-2-yl- (9CI) (CA INDEX NAME)



RN 824426-27-9 HCAPLUS

CN Phosphine oxide, phenylbis(9,9'-spirobi[9H-fluoren]-2-yl)- (CA INDEX NAME)

IPCI C09K0011-06 [ICM, 7]; H01L0051-30 [ICS, 7]; H01L0051-05 [ICS, 7, C*];
H05B0033-14 [ICS, 7]; C07F0015-00 [ICS, 7]IPCR C07F0015-00 [I, C*]; C07F0015-00 [I, A]; C08G0061-00 [I, C*]; C08G0061-12
[I, A]; C09K0011-06 [I, C*]; C09K0011-06 [I, A]; H01L0051-00 [I, C*];
H01L0051-00 [I, A]; H01L0051-05 [I, C*]; H01L0051-30 [I, A]; H01L0051-50
[N, C*]; H01L0051-50 [N, A]; H05B0033-14 [I, C*]; H05B0033-14 [I, A]

CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 52, 76

ST thin film transistor hole blocking material double bonded unit; transistor hole blocking material double bonded unit; org electroluminescent device hole blocking material double bonded unit; semiconductor laser hole blocking material double bonded unit; solar cell hole blocking material double bonded unit; integrated circuit hole blocking material double bonded unit; FET hole blocking material double bonded unit; hole blocking material double bonded unit

IT Thin film transistors
(devices with hole-blocking materials incorporating double bonded structural units)IT Imines
Ketones, uses
Phosphazenes
Phosphines
Sulfones
Sulfoxides
(devices with hole-blocking materials incorporating double bonded structural units)IT Electroluminescent devices
Field effect transistors
Integrated circuits

Semiconductor lasers
 Solar cells
 (organic; devices with hole-blocking materials incorporating double bonded structural units)
 IT 782504-07-8 782504-10-3 824426-27-9
 (devices with hole-blocking materials incorporating double bonded structural units)
 IT 7439-98-7D, Molybdenum, compds. 7440-04-2D, Osmium, compds.
 7440-05-3D, Palladium, compds. 7440-06-4D, Platinum, compds.
 7440-15-5D, Rhenium, compds. 7440-16-6D, Rhodium, compds.
 7440-18-8D, Ruthenium, compds. 7440-22-4D, Silver, compds.
 7440-33-7D, Tungsten, compds. 7440-53-1D, Europium, compds.
 7440-57-5D, Gold, compds. 94928-86-6, Tris(2-phenylpyridine)iridium
 435293-93-9
 (devices with hole-blocking materials incorporating double bonded structural units)

RETABLE

Referenced Author (RAU)	Year (R PY)	VOL (R VL)	PG (R PG)	Referenced Work (RWK)	Referenced File
Anon	1998	1998		PATENT ABSTRACTS OF	
Konica Corporation	2003			EP 1353388 A	HCAPLUS
Oki Electric Ind Co Ltd	1998			JP 10231479 A	HCAPLUS
Salbeck, J	1997	91	209	SYNTHETIC METALS	HCAPLUS
Sato, H	2002			US 2002125818 A1	
Spreitzer, H	2000	4105	125	PROCEEDINGS OF THE S	
Tokito, S	2000	363	290	THIN SOLID FILMS	
Watanabe, T	2002			US 2002015859 A1	HCAPLUS

L62 ANSWER 5 OF 5 HCAPLUS COPYRIGHT 2010 ACS on STN

ACCESSION NUMBER: 2005:493816 HCAPLUS Full-text

DOCUMENT NUMBER: 143:34908

TITLE: Organic electroluminescent element hole-blocking layers with six-membered ring unit-containing compounds and spirobifluorene derivatives and electronic devices using them

INVENTOR(S): Vestweber, Horst; Gerhard, Anja
 ; Stoessel, Philipp

PATENT ASSIGNEE(S): Covion Organic Semiconductors G.m.b.H.,
 Germany

SOURCE: PCT Int. Appl., 38 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2005053055	A1	20050609	WO 2004-EP13314	20041124
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW				
RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LU, MC, NL,				

PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN,
 GQ, GW, ML, MR, NE, SN, TD, TG
 DE 10356099 A1 20050707 DE 2003-10356099 20031127
 EP 1687857 A1 20060809 EP 2004-803245 20041124
 EP 1687857 B1 20090909
 R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC,
 PT, IE, SI, FI, RO, CY, TR, BG, CZ, EE, HU, PL, SK, IS
 CN 1954446 A 20070425 CN 2004-80035289 20041124
 JP 2007520875 T 20070726 JP 2006-540365 20041124
 AT 442675 T 20090915 AT 2004-803245 20041124
 US 20070051944 A1 20070308 US 2006-580491 20060523
 KR 2006122874 A 20061130 KR 2006-710343 20060526
 PRIORITY APPLN. INFO.: DE 2003-10356099 A 20031127
 WO 2004-EP13314 W 20041124

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

OTHER SOURCE(S): MARPAT 143:34908

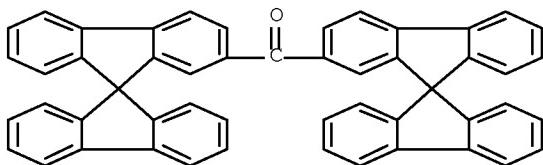
AB Organic electroluminescent devices comprising an anode, a cathode, and ≥ 1 emitting layer, which consists of a matrix material which is doped with ≥ 1 phosphorescent emitter, are described which employ compds. including units based on six-membered rings formed from C and/or N atoms, especially triazines, pyrimidines, pyridazines, and pyrazines, as materials for a hole-blocking layer between the emitting layer and the cathode. Compds., which may be employed in the devices, are described which comprise spirobifluorene derivs. with ≥ 1 triazine unit bonded to them, optionally along with other six-membered ring-containing substituents. The use of the design of the electroluminescent devices in other electronic devices, including organic transistors, organic integrated circuits, organic solar cells, organic laser diodes, or photoreceptors, is also described. Organic transistors, organic integrated circuits, organic solar cells, organic laser diodes, or photoreceptors.

IT 782504-07-8

(organic electroluminescent element with hole-blocking layers formed from compds. including six-membered rings and spirobifluorene derivs. and electronic devices using them)

RN 782504-07-8 HCPLUS

CN Methanone, bis(9,9'-spirobi[9H-fluoren]-2-yl)- (CA INDEX NAME)



IPCI H01L0051-30 [ICM,7]; H01L0051-05 [ICM,7,C*]; C07D0251-24 [ICS,7];
 C07D0251-00 [ICS,7,C*]; C07D0253-06 [ICS,7]; C07D0253-00 [ICS,7,C*];
 C07D0239-26 [ICS,7]; C07D0239-00 [ICS,7,C*]

IPCR C07D0239-00 [I,C*]; C07D0239-26 [I,A]; C07D0251-00 [I,C*]; C07D0251-24
 [I,A]; C07D0253-00 [I,C*]; C07D0253-065 [I,A]; H01L0051-05 [I,C*];
 H01L0051-30 [I,A]

CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

- Section cross-reference(s): 25, 27, 28, 74, 76
- ST spirobifluorene deriv hole blocking layer electronic device; transistor six membered ring deriv hole blocking layer; integrated circuit six membered ring deriv hole blocking layer; solar cell six membered ring deriv hole blocking layer; laser diode six membered ring deriv hole blocking layer; photoreceptor six membered ring deriv hole blocking layer; six membered ring deriv hole blocking layer electronic device; triazine deriv hole blocking layer org electroluminescent device; pyrimidine deriv hole blocking layer org electroluminescent device; pyrazine deriv hole blocking layer org electroluminescent device; pyridazine deriv hole blocking layer org electroluminescent device
- IT Imines
Ketones, uses
Phosphazenes
Phosphines
Sulfones
Sulfoxides
(emitting layer matrix; organic electroluminescent element with hole-blocking layers formed from compds. including six-membered rings and spirobifluorene derivs. and electronic devices using them)
- IT Spiro compounds
(organic electroluminescent element with hole-blocking layers formed from compds. including six-membered rings and spirobifluorene derivs. and electronic devices using them)
- IT Electroluminescent devices
Electrophotographic photoconductors (photoreceptors)
Integrated circuits
Semiconductor lasers
Solar cells
Transistors
(organic; organic electroluminescent element with hole-blocking layers formed from compds. including six-membered rings and spirobifluorene derivs. and electronic devices using them)
- IT 7439-98-7D, Molybdenum, derivs. 7440-04-2D, Osmium, derivs.
7440-05-3D, Palladium, derivs. 7440-06-4D, Platinum, derivs.
7440-15-5D, Rhenium, derivs. 7440-16-6D, Rhodium, derivs.
7440-18-8D, Ruthenium, derivs. 7440-22-4D, Silver, derivs.
7440-33-7D, Tungsten, derivs. 7440-53-1D, Europium, derivs.
7440-57-5D, Gold, derivs.
(emitting layer dopant; organic electroluminescent element with hole-blocking layers formed from compds. including six-membered rings and spirobifluorene derivs. and electronic devices using them)
- IT 289-80-5D, Pyridazine, derivs. 289-95-2D, Pyrimidine, derivs.
290-37-9D, Pyrazine, derivs. 782504-07-8
(organic electroluminescent element with hole-blocking layers formed from compds. including six-membered rings and spirobifluorene derivs. and electronic devices using them)
- IT 94928-86-6, Tris(2-phenylpyridine)iridium
(organic electroluminescent element with hole-blocking layers formed from compds. including six-membered rings and spirobifluorene derivs. and electronic devices using them)

August 16, 2010

10/581,005

24

- IT 853154-59-3P 853154-60-6P 853154-61-7P
 (organic electroluminescent element with hole-blocking layers formed from compds. including six-membered rings and spirobifluorene derivs. and electronic devices using them)
- IT 3842-55-5, 2-Chloro-4,6-diphenyl-1,3,5-triazine 34177-11-2,
 3-Chloro-5,6-diphenyl-1,2,4-triazine 463944-32-3 853154-62-8
 (organic electroluminescent element with hole-blocking layers formed from compds. including six-membered rings and spirobifluorene derivs. and electronic devices using them)

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Anon	2003	2003		PATENT ABSTRACTS OF	
Fink, R	2002			US 6352791 B1	HCAPLUS
Hayoz, P	2004			WO 2004077885 A	HCAPLUS
Hoechst Ag	1996			DE 4446818 A1	HCAPLUS
Hu, N	2001			US 6229012 B1	HCAPLUS
Jean-Hugues, F	2004	69	1762	JOURNAL OF ORGANIC C	
Nishi, T	2002			US 2002034659 A1	HCAPLUS
Toray Ind Inc	2003			JP 2003086381 A	HCAPLUS
Wu, C	2002	81	577	APPLIED PHYSICS LETT	HCAPLUS
Xerox Corporation	2004			EP 1385221 A	HCAPLUS
OS.CITING REF COUNT:	4			THERE ARE 4 CAPLUS RECORDS THAT CITE THIS RECORD (9 CITINGS)	

=> D L64 1-10 IBIB ABS HITSTR HITIND RETABLE

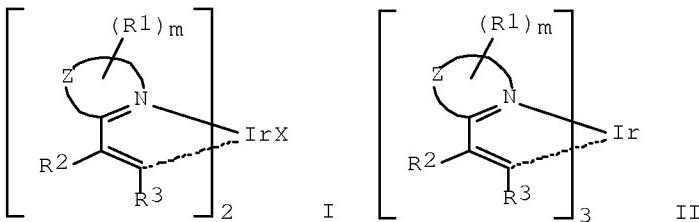
L64 ANSWER 1 OF 10 HCAPLUS COPYRIGHT 2010 ACS on STN
 ACCESSION NUMBER: 2005:1106699 HCAPLUS Full-text
 DOCUMENT NUMBER: 143:376222
 TITLE: Organic light emitting diode
 containing a novel Ir complex as a
 phosphorescent emitter
 INVENTOR(S): Cheng, Chien-Hong; Duan, Jiun-Pey; Rayabarapu,
 Dinesh Kumar; Jennifer, Betty Marie
 PATENT ASSIGNEE(S): Cheng, Chien-Hong, Taiwan
 SOURCE: U.S. Pat. Appl. Publ., 25 pp.
 CODEN: USXXCO
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 2
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 20050227109	A1	20051013	US 2004-822647 <--	20040413
US 7320834	B2	20080122		
TW 232704	B	20050511	TW 2003-92120288 <--	20030724
KR 2005012132	A	20050131	KR 2004-55376 <--	20040716
KR 853701	B1	20080825		
PRIORITY APPLN. INFO.:			TW 2003-92120288 <--	A 20030724

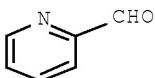
ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

OTHER SOURCE(S) :
GI

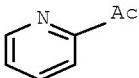
MARPAT 143:376222



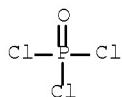
- AB Organic light-emitting diodes are described which employ an electroluminescent medium which comprises a phosphorescent Ir complex described by general formula I or II (X = a monoanionic bidentate ligand; Z = an atomic moiety capable of forming a nitrogen-containing heterocyclic group; R1 = H, halo, C1-6 alkyl, halogen-substituted C1-6 alkyl, C1-6 alkoxy, Ph-C1-6 alkyl, amino, and aryl; m = 0 or any pos. integer determined by the ring size of the nitrogen-containing heterocyclic group; R2 and R3 = independently selected H, halogen, C1-6 alkyl, halogen-substituted C1-6 alkyl, C1-6 alkoxy, Ph-C1-6 alkyl, amino, aryl, and heterocyclic aryl).
IT 1121-60-4, 2-Pyridinecarboxaldehyde 1122-62-9
10025-87-3, Phosphoryl chloride
(organic light-emitting diodes employing iridium complexes as phosphorescent emitters)
RN 1121-60-4 HCPLUS
CN 2-Pyridinecarboxaldehyde (CA INDEX NAME)



- RN 1122-62-9 HCAPLUS
CN Ethanone, 1-(2-pyridinyl)- (CA INDEX NAME)



- RN 10025-87-3 HCAPLUS
CN Phosphoric trichloride (CA INDEX NAME)



INCL 428690000; X42-891.7; X31-350.4; X31-350.6; X25-710.2
 IPCI H01L0051-54 [I,A]; H01L0051-50 [I,C*]; C09K0011-06 [N,A]
 IPCR H05B0033-14 [I,C*]; H05B0033-14 [I,A]; H01L0051-50 [I,C]; H01L0051-50
 [I,A]; H01L0051-54 [I,A]; C09K0011-06 [I,C*]; C09K0011-06 [I,A];
 H05B0033-12 [I,C*]; H05B0033-20 [I,A]; H05B0033-22 [I,C*]; H05B0033-22
 [I,A]
 NCL 428/690.000; 257/102.000; 313/504.000; 313/506.000; 428/917.000;
 257/E51.044
 CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related
 Properties)
 Section cross-reference(s): 76, 78
 ST org light emitting diode iridium complex
 phosphorescent emitter
 IT Phosphorescent substances
 (organic light-emitting diodes employing iridium
 complexes as phosphorescent emitters)
 IT Electroluminescent devices
 (organic; organic light-emitting diodes employing
 iridium complexes as phosphorescent emitters)
 IT 2085-33-8, Tris(8-hydroxyquinolinato)aluminum 123847-85-8, NPB
 192198-85-9, TPBI
 (electron-transporting material; organic light-
 emitting diodes employing iridium complexes as
 phosphorescent emitters)
 IT 185690-41-9, 4,4',4'''-Tris(2-naphthylphenylamino)triphenylamine
 (hole injection modification layer containing; organic light-
 emitting diodes employing iridium complexes as
 phosphorescent emitters)
 IT 4733-39-5, BCP 146162-54-1, BAQ
 (hole-blocking layer containing; organic light-
 emitting diodes employing iridium complexes as
 phosphorescent emitters)
 IT 19287-68-4 58328-31-7
 (hole-transporting material; organic light-emitting
 diodes employing iridium complexes as phosphorescent
 emitters)
 IT 844818-66-2P 844818-67-3P 844818-68-4P 844818-69-5P
 844818-70-8P 844818-71-9P 844818-72-0P 844818-73-1P
 844818-74-2P 844818-75-3P
 (organic light-emitting diodes employing iridium
 complexes as phosphorescent emitters)
 IT 75-03-6, Ethyl iodide 100-39-0 109-04-6, 2-Bromopyridine
 536-74-3, Phenylacetylene 603-35-0, Triphenylphosphine, reactions
 612-62-4 615-20-3 634-47-9 688-73-3, Tributyltin hydride
 1121-60-4, 2-Pyridinecarboxaldehyde 1122-62-9
 1532-72-5, Isoquinoline N-oxide 3510-66-5 10025-83-9, Iridium
 trichloride 10025-87-3, Phosphoryl chloride 15727-65-8
 52248-74-5 52334-81-3 59066-57-8,
 1-(E)-2-Phenyl-1-ethenyl)isoquinoline
 (organic light-emitting diodes employing iridium
 complexes as phosphorescent emitters)
 IT 538-49-8P 4736-60-1P, Triphenylethylphosphonium iodide 7370-19-6P

13673-46-6P 19493-44-8P, 1-Chloroisooquinoline 38101-69-8P,
 2-((E)-2-Phenyl-1-ethenyl)quinoline 53500-07-5P 59066-61-4P
 66680-88-4P 84586-45-8P, 4-Methyl-2-((E)-2-phenyl-1-
 ethenyl)quinoline 844698-46-0P
 (organic light-emitting diodes employing iridium
 complexes as phosphorescent emitters)

RETABLE

Referenced Author (RAU)	Year (R PY)	VOL (R VL)	PG (R PG)	Referenced Work (RWK)	Referenced File
Deaton	2005			US 20050123792 A1	HCAPLUS
Deaton	2005			US 20050123798 A1	HCAPLUS
Hamada	2003			US 20030194580 A1	HCAPLUS
Hamada	2006			US 7022422 B2	HCAPLUS
Lussier	2005			US 20050123795 A1	HCAPLUS
Sano	1995			US 5432014 A	HCAPLUS
Sato	2002			US 20020125818 A1	HCAPLUS
Takiguchi	2002			US 20020100906 A1	HCAPLUS
Takiguchi	2004			US 6797980 B2	HCAPLUS
Thompson	2002			US 20020034656 A1	HCAPLUS

L64 ANSWER 2 OF 10 HCAPLUS COPYRIGHT 2010 ACS on STN

ACCESSION NUMBER: 2005:275804 HCAPLUS Full-text

DOCUMENT NUMBER: 142:363426

TITLE: Organic electroluminescent devices with
 high luminance, durability, and emission
 efficiency and materials therefor

INVENTOR(S): Onikubo, Shunichi; Enokida, Toshio; Suda,
 Yasumasa; Toba, Yasumasa; Kimura, Yasunori;
 Kaneko, Tetsuya

PATENT ASSIGNEE(S): Toyo Ink Mfg. Co., Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 35 pp.

CODEN: JKXXAF

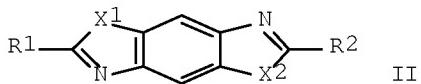
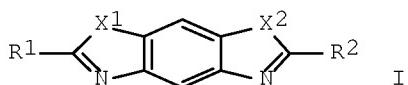
DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2005082703	A	20050331	JP 2003-316325	20030909
JP 4306379	B2	20090729	<--	
PRIORITY APPLN. INFO.:			JP 2003-316325	20030909
OTHER SOURCE(S):		MARPAT 142:363426	<--	
GI				

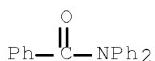


AB The materials contain (A) heterocyclic compds. wherein plural N-containing rings are fused directly or via other carbon or heterocyclic rings and (B) phosphorescent substances (e.g., organic compds., Ir or Pt complexes with organic ligands). The compds. A may be I or II [X1, X2 = O, S, NR3; R1-R3 = (cyclo)alkyl, aryl, heterocyclic]. In organic EL devices having emitting layers or those-including plural organic layers between a pair of electrodes, ≥ 1 of the layers contain the above materials. The devices may have electron-injecting layers between cathodes and the emitting layers, hole-blocking layers between the electron-injecting layers and the emitting layers, and/or hole-injecting layers between anodes and the emitting layers.

IT 4051-56-3 31671-77-9, Anthraldehyde
(in preparation of phosphors; phosphors containing benzobisthiazole-like fused heterocyclic compds. for durable organic EL devices with high emission efficiency)

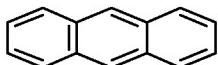
RN 4051-56-3 HCAPLUS

CN Benzamide, N,N-diphenyl- (CA INDEX NAME)



RN 31671-77-9 HCAPLUS

CN Anthracenecarboxaldehyde (CA INDEX NAME)



D1-CHO

IPCI C09K0011-06 [I,A]; H01L0051-50 [I,A]

IPCR C09K0011-06 [I,A]; C09K0011-06 [I,C*]; H05B0033-14 [I,A]; H05B0033-14 [I,C*]; H01L0051-50 [I,C*]; H01L0051-50 [I,A]

CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST org electroluminescent emission efficiency durability
luminance; EL phosphor benzobisthiazole benzobisoxazole

benzobisimidazole; phosphorescent iridium platinum complex
doped EL phosphor

IT Electroluminescent devices
(organic; phosphors containing benzobisthiazole-like fused heterocyclic compds. for durable organic EL devices with high emission efficiency)

IT Phosphors
(phosphors containing benzobisthiazole-like fused heterocyclic compds. for durable organic EL devices with high emission efficiency)

IT 14187-14-5 31248-39-2 94928-86-6 149005-33-4 343978-94-9
376367-93-0 848902-76-1
(dopants, emitting layers; phosphors containing benzobisthiazole-like fused heterocyclic compds. for durable organic EL devices with high emission efficiency)

IT 2085-33-8 395644-78-7
(electron-injecting layers; phosphors containing benzobisthiazole-like fused heterocyclic compds. for durable organic EL devices with high emission efficiency)

IT 65181-78-4
(emitting layers, hole-injecting layers; phosphors containing benzobisthiazole-like fused heterocyclic compds. for durable organic EL devices with high emission efficiency)

IT 905-62-4, 2,5-Bis(1-naphthyl)-1,3,4-oxadiazole
(emitting layers; phosphors containing benzobisthiazole-like fused heterocyclic compds. for durable organic EL devices with high emission efficiency)

IT 219596-73-3P 219596-76-6P 219597-18-9P
(emitting layers; phosphors containing benzobisthiazole-like fused heterocyclic compds. for durable organic EL devices with high emission efficiency)

IT 13399-13-8 133531-74-5 219596-84-6 219596-97-1 219597-01-0
219597-22-5 219597-29-2 219597-32-7 219597-58-7 848941-49-1
848941-50-4 848941-51-5 848941-52-6 848941-53-7 848941-54-8
(emitting layers; phosphors containing benzobisthiazole-like fused heterocyclic compds. for durable organic EL devices with high emission efficiency)

IT 1662-01-7, Bathophenanthroline 4733-39-5, Bathocuproin 146162-49-4
150405-69-9, 3-(4-Biphenyl)-4-phenyl-5-(4-tert-butylphenyl)-1,2,4-triazole 188049-37-8 221554-51-4 848902-77-2 848902-78-3
(hole-blocking layers; phosphors containing benzobisthiazole-like fused heterocyclic compds. for durable organic EL devices with high emission efficiency)

IT 147-14-8, Copper phthalocyanine 123847-85-8 182507-83-1
185690-39-5, 4,4',4''-Tris[N-(1-naphthyl)-N-phenylamino]triphenylamine
(hole-injecting layers; phosphors containing benzobisthiazole-like fused heterocyclic compds. for durable organic EL devices with high emission efficiency)

IT 4051-56-3 16523-31-2 31671-77-9, Anthraldehyde
848941-55-9
(in preparation of phosphors; phosphors containing benzobisthiazole-like fused heterocyclic compds. for durable organic EL devices with high emission efficiency)

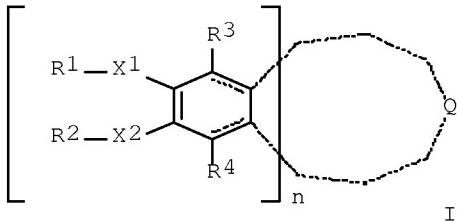
August 16, 2010

10/581,005

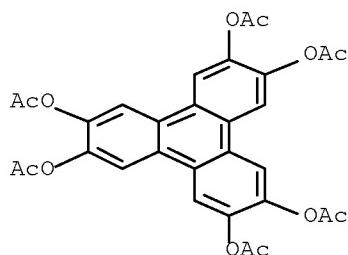
30

INVENTOR(S): Onikubo, Shunichi; Enokida, Toshio; Suda, Yasumasa; Toba, Yasumasa; Kimura, Yasunori; Kaneko, Tetsuya
PATENT ASSIGNEE(S): Toyo Ink Mfg. Co., Ltd., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 54 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2005082702	A	20050331	JP 2003-316324 <--	20030909
PRIORITY APPLN. INFO.:			JP 2003-316324 <--	20030909
OTHER SOURCE(S): MARPAT 142:363425 GI				

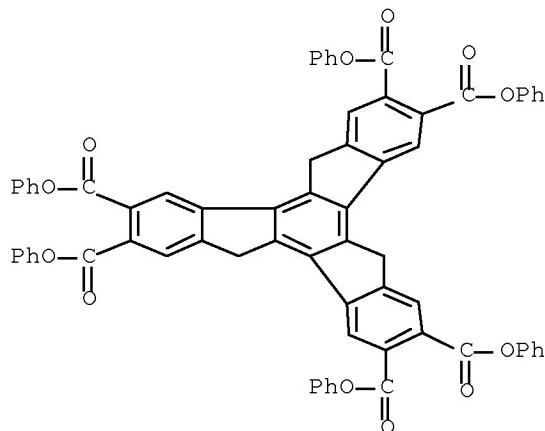


- AB The materials contain compds. having I units [X1, X2 = O, CO₂, OCO; R1, R2 = (cyclo)alkyl, aryl, heterocyclic; R3, R4 = H, halo, CN, NO₂, alkyl(oxy), aryl(oxy), alkylthio, arylthio, amino, acyl, heterocyclic; Q = fused ring structure or linking group forming rings with the units; n = 2-6] and phosphorescent substances (e.g., organic compds., Ir or Pt complexes with organic ligands). In organic EL devices having emitting layers (A) or A-including plural organic layers between a pair of electrodes, ≥1 of the layers contain the above materials. The devices may have hole-injecting layers (B) between anodes and A, electron-blocking layers between A and B, electron-injecting layers (C) between cathodes and A, and/or hole-blocking layers between C and A.
- IT 32829-08-6 848940-24-9
(emitting layers; fused aromatic compound-containing phosphors for organic EL devices with high luminance, durability, and emission efficiency)
- RN 32829-08-6 HCPLUS
- CN 2,3,6,7,10,11-Triphenylenehexol, 2,3,6,7,10,11-hexaacetate (CA INDEX NAME)



RN 848940-24-9 HCAPLUS

CN 5H-Tribenzo[a,f,k]trindene-2,3,7,8,12,13-hexacarboxylic acid,
10,15-dihydro-, 2,3,7,8,12,13-hexaphenyl ester (CA INDEX NAME)



IPCI C09K0011-06 [ICM,7]; H05B0033-14 [ICS,7]; H05B0033-22 [ICS,7]

IPCR C09K0011-06 [I,A]; C09K0011-06 [I,C*]; H05B0033-14 [I,A]; H05B0033-14
[I,C*]; H05B0033-22 [I,A]; H05B0033-22 [I,C*]

CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST org electroluminescent emission efficiency durability
luminance; fused alkoxybenzene acyloxybenzene benzenecarboxylic acid
EL phosphor; alkoxytriphenylene phosphor iridium platinum
complex doped EL

IT Phosphors
(fused aromatic compound-containing phosphors for organic EL devices
with high luminance, durability, and emission efficiency)

IT Electroluminescent devices
(organic; fused aromatic compound-containing phosphors for organic EL
devices with high luminance, durability, and emission efficiency)

IT 14187-14-5 31248-39-2 94928-86-6 149005-33-4 344796-24-3
376367-93-0 848902-76-1
(dopants, emitting layers; fused aromatic compound-containing phosphors for
organic EL devices with high luminance, durability, and
emission efficiency)

IT 208939-07-5 848940-26-1
(electron-blocking layers; fused aromatic compound-containing

phosphors for organic EL devices with high luminance, durability, and emission efficiency)

IT 2085-33-8 23467-27-8 395644-78-7
 (electron-injecting layers; fused aromatic compound-containing phosphors for organic EL devices with high luminance, durability, and emission efficiency)

IT 905-62-4, 2,5-Bis(1-naphthyl)1,3,4-oxadiazole 58328-31-7, CBP
 65181-78-4 192198-85-9
 (emitting layers; fused aromatic compound-containing phosphors for organic EL devices with high luminance, durability, and emission efficiency)

IT 23417-07-4 32829-08-6 32829-11-1 134025-08-4
 134025-15-3 134656-41-0 162281-25-6 208938-92-5 208939-01-9
 208939-08-6 208939-12-2 208939-44-0 848940-19-2 848940-20-5
 848940-22-7 848940-23-8 848940-24-9 848940-25-0
 848940-28-3
 (emitting layers; fused aromatic compound-containing phosphors for organic EL devices with high luminance, durability, and emission efficiency)

IT 808-57-1P
 (fused aromatic compound-containing phosphors for organic EL devices with high luminance, durability, and emission efficiency)

IT 1662-01-7, Bathophenanthroline 4733-39-5, Bathocuproin 146162-49-4
 146162-54-1 150405-69-9, 3-(4-Biphenyl)-4-phenyl-5-(4-tert-butylphenyl)-1,2,4-triazole 221554-51-4 848902-77-2 848902-78-3
 (hole-blocking layers; fused aromatic compound-containing phosphors for organic EL devices with high luminance, durability, and emission efficiency)

IT 208939-55-3 848940-21-6 848940-27-2
 (hole-injecting and electron-blocking layers; fused aromatic compound-containing phosphors for organic EL devices with high luminance, durability, and emission efficiency)

IT 147-14-8, Copper phthalocyanine 123847-85-8 182507-83-1
 185690-39-5, 4,4',4''-Tris[N-(1-naphthyl)-N-phenylamino]triphenylamine
 (hole-injecting layers; fused aromatic compound-containing phosphors for organic EL devices with high luminance, durability, and emission efficiency)

IT 91-16-7, 1,2-Dimethoxybenzene
 (in preparation of phosphors; fused aromatic compound-containing phosphors for organic EL devices with high luminance, durability, and emission efficiency)

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD (1 CITINGS)

L64 ANSWER 4 OF 10 HCAPLUS COPYRIGHT 2010 ACS on STN
 ACCESSION NUMBER: 2005:78038 HCAPLUS Full-text
 DOCUMENT NUMBER: 142:186236
 TITLE: Materials and structures for enhancing the performance of organic light emitting devices and use of aromatic hydrocarbon material as enhancement layer for hole blocking and superior electron injection
 INVENTOR(S): Thompson, Mark E.; Kwong, Raymond; Tung, Yeh-Jiun
 PATENT ASSIGNEE(S): The University of Southern California, USA;
 Universal Display Corporation
 SOURCE: U.S. Pat. Appl. Publ., 16 pp.
 CODEN: USXXCO
 DOCUMENT TYPE: Patent

August 16, 2010

10/581,005

33

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 20050019604	A1	20050127	US 2003-626579 -->	20030725
US 7018723	B2	20060328		
US 20050025993	A1	20050203	US 2004-785287 -->	20040223
WO 2005013388	A2	20050210	WO 2004-US23349 -->	20040721
WO 2005013388	A3	20050428		
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW				
RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
US 20080309222	A1	20081218	US 2007-974020 -->	20071010

PRIORITY APPLN. INFO.:	US 2003-626579 -->	A2 20030725
	US 2004-785287	A 20040223

OTHER SOURCE(S): MARPAT 142:186236

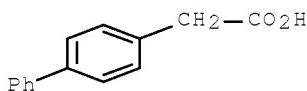
AB Electroluminescent devices are described which comprise an anode; a cathode; a first organic layer disposed between the anode and the cathode, where the first organic layer comprises a material that produces phosphorescent emission when a voltage is applied between the anode and the cathode; and a second organic layer disposed between the first organic layer and the cathode, where the second organic layer is in direct contact with the first organic layer, and where the second organic layer comprises an aromatic hydrocarbon material.

IT 5728-52-9, 4-Biphenylacetic acid

(aromatic hydrocarbon material as enhancement layer for hole blocking and superior electron injection prepared using)

RN 5728-52-9 HCPLUS

CN [1,1'-Biphenyl]-4-acetic acid (CA INDEX NAME)



INCL 428690000; X42-891.7; X42-821.2; X31-350.4; X31-350.6

IPCI H05B0033-12 [I,A]

IPCR C07C0013-00 [I,C*]; C07C0013-567 [I,A]; C07C0013-66 [I,A]; C07C0015-00 [I,C*]; C07C0015-24 [I,A]; C07C0015-38 [I,A]; C09K0011-06 [I,C*]; C09K0011-06 [I,A]; H01L0051-00 [N,C*]; H01L0051-00 [N,A]; H01L0051-05 [I,C*]; H01L0051-30 [I,A]; H01L0051-50 [I,C*]; H01L0051-50 [I,A];

H05B0033-14 [I,C*]; H05B0033-14 [I,A]; H05B0033-12 [I,A]; H05B0033-12 [I,C]

NCL 428/690.000; 313/504.000; 313/506.000; 428/212.000; 428/917.000

CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 22, 25, 76

ST org emitting device arom hydrocarbon hole blocking electron injection

IT Electroluminescent devices
 (materials and structures for enhancing performance of organic light emitting devices and use of aromatic hydrocarbon material as enhancement layer for hole blocking and superior electron injection)

IT 94928-86-6, Tris(2-phenylpyridine)iridium
 (CBP doped with; materials and structures for enhancing performance of organic light emitting devices and use of aromatic hydrocarbon material as enhancement layer for hole blocking and superior electron injection)

IT 448-61-3, 2,4,6-Triphenylpyrylium tetrafluoroborate 1310-73-2,
 Sodium hydroxide, reactions 5728-52-9, 4-Biphenylacetic acid
 (aromatic hydrocarbon material as enhancement layer for hole blocking and superior electron injection prepared using)

IT 58328-31-7
 (doped emissive layer; materials and structures for enhancing performance of organic light emitting devices and use of aromatic hydrocarbon material as enhancement layer for hole blocking and superior electron injection)

IT 751-38-2D, derivs. 2085-33-8, Alq3 97388-42-6D, derivs.
 (electron-transporting layer; materials and structures for enhancing performance of organic light emitting devices and use of aromatic hydrocarbon material as enhancement layer for hole blocking and superior electron injection)

IT 97388-42-6P
 (electron-transporting layer; materials and structures for enhancing performance of organic light emitting devices and use of aromatic hydrocarbon material as enhancement layer for hole blocking and superior electron injection)

IT 751-38-2
 (materials and structures for enhancing performance of organic light emitting devices and use of aromatic hydrocarbon material as enhancement layer for hole blocking and superior electron injection)

RETABLE

Referenced Author (RAU)	Year (R PY)	VOL (R VL)	PG (R PG)	Referenced Work (R WK)	Referenced File
Adachi	2001	190	15048	J. Appl. Phys.	HCAPLUS
Adachi, C	2000	177	1904	Applied Physics Lett	HCAPLUS
Anon	1999			WO 9965961	HCAPLUS
Anon	2002			WO 02052661 A1	
Anon	2002			WO 02074015	HCAPLUS
Anon	2003			WO 03007658	HCAPLUS
Bacher		3148	313	SPIE	HCAPLUS
Baldo	1999	175	4	Appl. Phys. Lett.	
Baldo	1998	395	151	Nature	HCAPLUS
Bulovic	1998			US 5834893 A	HCAPLUS
Forrest	1997			US 5703436 A	HCAPLUS
Forrest	1998			US 5707745 A	HCAPLUS
Forrest	2000			US 6091195 A	HCAPLUS

Forrest	2002		US 6337102 B1	HCAPLUS
Friend	1993		US 5247190 A	
Gu	1998		US 5844363 A	HCAPLUS
Igarashi	2003		US 20030039858 A1	HCAPLUS
Ishikawa	2002		US 6492041 B1	HCAPLUS
Kenji Okumoto	2003	15	699 Chem. Mater.	
Kim	2001		US 6294398 B1	
Kim	2002		US 6468819 B1	HCAPLUS
Kinoshita, M	2002	10	780 Adv. Funct. Mater.	
Kwong, R	2002	81	162 Applied Physics Lett	HCAPLUS
Lee, C	2000	77	2280 Applied Physics Lett	HCAPLUS
Sakon	1991		US 5077142 A	HCAPLUS
Stossel	2004		US 20040058194 A1	HCAPLUS
Sturm	2000		US 6087196 A	HCAPLUS
Suzuki	2004		US 6830829 B1	HCAPLUS
Tamano	2000		US 6150042 A	HCAPLUS
Tamano	2001		US 6245449 B1	HCAPLUS
Thompson	2000		US 6013982 A	HCAPLUS
Thompson	2001		US 6303238 B1	HCAPLUS
Thompson	2003		US 20030068528 A1	HCAPLUS
Thompson	2004		US 20040155238 A1	HCAPLUS
Vadim Adamovich	2002		MRS Spring Meeting	
Vadim Adamovich	2003	4	77 Organic Electronics	
Wang, Y	2001	79	449 Applied Physics Lett	HCAPLUS
Xie	1999		US 5989737 A	HCAPLUS
OS.CITING REF COUNT:	1		THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD (1 CITINGS)	

L64 ANSWER 5 OF 10 HCAPLUS COPYRIGHT 2010 ACS on STN
 ACCESSION NUMBER: 2004:609639 HCAPLUS [Full-text](#)
 DOCUMENT NUMBER: 141:147906
 TITLE: Organic light emitting diode device with organic hole transporting material and phosphorescent material
 INVENTOR(S): Lee, Yung-Chih; Chen, Wei-Su; Liao, Chi-Chih; Lee, Jiun-Haw
 PATENT ASSIGNEE(S): Ritdisplay Corp., Taiwan
 SOURCE: U.S. Pat. Appl. Publ., 7 pp.
 CODEN: USXXCO
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 20040144974	A1	20040729	US 2003-248553	20030129 -->
US 6822257	B2	20041123		
PRIORITY APPLN. INFO.:			US 2003-248553	20030129 -->

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

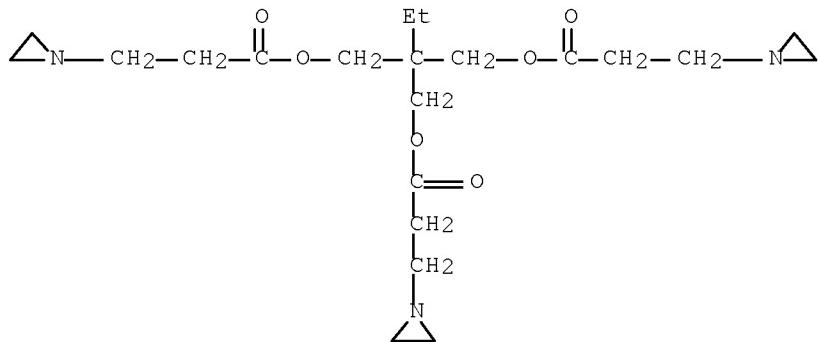
AB An organic light emitting diode (OLED) device that comprises a substrate, an anode layer, a light-emitting layer, a hole blocking layer and a cathode layer. The anode layer is positioned over the substrate and the light-emitting layer is positioned over the anode layer. The hole blocking layer is positioned over the light-emitting layer and the cathode layer is positioned over the hole blocking layer. The light-emitting layer is an organic material layer consisted of hole transporting material and phosphorescent material and that the concentration of hole transporting material and

phosphorescent material in the organic material layer is between 40% to 60% by weight

IT 52234-82-9, TAZ
 (organic light emitting diode device with organic hole transporting material and phosphorescent material)

RN 52234-82-9 HCAPLUS

CN 1-Aziridinepropanoic acid, 1,1'-[2-[3-(1-aziridinyl)-1-oxopropoxy]methyl]-2-ethyl-1,3-propanediyl ester (CA INDEX NAME)



INCL 257040000; 257082000; 257184000

IPCI H01L0035-24 [ICM,7]; H01L0035-12 [ICM,7,C*]; H01L0051-00 [ICS,7];
 H01L0027-15 [ICS,7]; H01L0031-12 [ICS,7]

IPCR H01L0051-05 [N,C*]; H01L0051-30 [N,A]; H01L0051-50 [I,C*]; H01L0051-50 [I,A]; H01L0051-00 [N,C*]; H01L0051-00 [N,A]

NCL 257/040.000; 257/082.000; 257/184.000; 257/079.000; 257/098.000;
 257/099.000; 257/102.000; 257/103.000

CC 73-12 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
 Section cross-reference(s): 76

ST org light emitting diode hole transporting
 phosphorescent material; OLED hole transporting
 phosphorescent material

IT Electroluminescent devices
 Hole (electron)
 Phosphorescent substances
 Phosphors
 (organic light emitting diode device with organic
 hole transporting material and phosphorescent material)

IT 119-65-3D, Isoquinoline, iridium complexes 147-14-8, Copper
 phthalocyanine 841-73-6, BCP 2085-33-8 7429-90-5, Aluminum, uses
 7439-88-5D, Iridium, isoquinoline complexes 7440-70-2, Calcium, uses
 15082-28-7, PBD 37271-44-6 37275-76-6, Aluminum zinc oxide
 50926-11-9, Indium tin oxide 52234-82-9, TAZ 65181-78-4,
 TPD 117944-65-7, Indium zinc oxide 123847-85-8, NPB 124729-98-2,
 m-MTDATA 146162-54-1, Balq 148896-39-3 192198-85-9, TPBI
 (organic light emitting diode device with organic
 hole transporting material and phosphorescent material)

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Adachi	2002			US 20020180347 A1	HCAPLUS
Adachi	2003			US 6573651 B2	HCAPLUS

Baldo	2000	US 6097147 A	HCAPLUS
Bellmann	2003	US 20030068525 A1	HCAPLUS
Hsieh	2003	US 20030162299 A1	HCAPLUS
Kwong	2002	US 20020074935 A1	HCAPLUS
Li	2003	US 20030138657 A1	HCAPLUS
Mishima	2002	US 20020096995 A1	HCAPLUS
Mori	2004	US 20040028944 A1	HCAPLUS
Sato	2003	US 20030218418 A9	HCAPLUS
OS.CITING REF COUNT:	2	THERE ARE 2 CAPLUS RECORDS THAT CITE THIS RECORD (2 CITINGS)	

L64 ANSWER 6 OF 10 HCAPLUS COPYRIGHT 2010 ACS on STN
 ACCESSION NUMBER: 2004:119647 HCAPLUS Full-text
 DOCUMENT NUMBER: 140:189702
 TITLE: Polynuclear metal complexes as phosphorescence emitters in electroluminescent layer arrangements
 INVENTOR(S): Heuer, Helmut-Werner; Wehrmann, Rolf; Sautter, Armin
 PATENT ASSIGNEE(S): Germany
 SOURCE: U.S. Pat. Appl. Publ., 30 pp.
 CODEN: USXXCO
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	-----
US 20040026663	A1	20040212	US 2003-635842 <--	20030806
EP 1394171	A1	20040303	EP 2003-17031 <--	20030728
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK CA 2436658	A1	20040209	CA 2003-2436658 <--	20030806
JP 2004075681	A	20040311	JP 2003-206477 <--	20030807
KR 2004014346	A	20040214	KR 2003-54907 <--	20030808
PRIORITY APPLN. INFO.:			DE 2002-10236538	A 20020809 <--

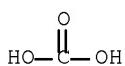
ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT
 OTHER SOURCE(S): MARPAT 140:189702

AB Polynuclear metal complexes of the general formula (LmMe-HL)n-XL, a process for their preparation and their use as phosphorescence emitters in electroluminescent layer arrangements are described, where Me is a transition metal, L is a bidentate chelate-forming ligand, HL is a bidentate chelate-forming ligand which complexes the transition metal Me and is addnl. bonded to a linker XL, XL is an n-functional linker and is covalently bonded to n auxiliary ligands HL, n is an integer from 2 to 6 and m is an integer from 1 to 3.

IT 497-19-8, Sodium carbonate (Na₂CO₃), uses 584-08-7
 , Potassium carbonate (K₂CO₃)
 (base, polynuclear metal complex prepared using; polynuclear metal complexes, their preparation and use as phosphorescence emitters in electroluminescent layer arrangements)

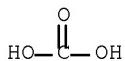
RN 497-19-8 HCAPLUS

CN Carbonic acid sodium salt (1:2) (CA INDEX NAME)



●2 Na

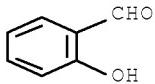
RN 584-08-7 HCPLUS
 CN Carbonic acid, potassium salt (1:2) (CA INDEX NAME)



●2 K

IT 90-02-8, 2-Hydroxybenzaldehyde, reactions
 (polynuclear metal complexes, their preparation and use as
 phosphorescence emitters in electroluminescent
 layer arrangements)

RN 90-02-8 HCPLUS
 CN Benzaldehyde, 2-hydroxy- (CA INDEX NAME)



INCL 252301160; 428690000; 556018000
 IPCI C09K0011-06 [ICM, 7]; C07F0001-00 [ICS, 7]
 IPCR H05B0033-10 [I,C*]; H05B0033-10 [I,A]; C07B0061-00 [I,C*]; C07B0061-00
 [I,A]; C07C0249-00 [I,C*]; C07C0249-02 [I,A]; C07C0251-00 [I,C*];
 C07C0251-24 [I,A]; C07D0213-00 [I,C*]; C07D0213-16 [I,A]; C07D0213-26
 [I,A]; C07D0409-00 [I,C*]; C07D0409-04 [I,A]; C07F0005-00 [I,C*];
 C07F0005-00 [I,A]; C07F0015-00 [I,C*]; C07F0015-00 [I,A]; C09K0011-06
 [I,C*]; C09K0011-06 [I,A]; H01L0051-00 [I,C*]; H01L0051-00 [I,A];
 H01L0051-05 [I,C*]; H01L0051-30 [I,A]; H01L0051-50 [I,C*]; H01L0051-50
 [I,A]
 NCL 252/301.160; 428/690.000; 556/018.000
 CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related
 Properties)
 Section cross-reference(s): 76, 78
 ST polynuclear metal complex phosphorescence
 electroluminescent device
 IT Amines, uses
 (aromatic, hole-conducting layer; polynuclear metal complexes, their
 preparation and use as phosphorescence emitters in
 electroluminescent layer arrangements)

- IT Amines, uses
(aryl, tertiary, polynuclear metal complex-doped; polynuclear metal complexes, their preparation and use as phosphorescence emitters in electroluminescent layer arrangements)
- IT Luminescent substances
(electroluminescent; polynuclear metal complexes, their preparation and use as phosphorescence emitters in electroluminescent layer arrangements)
- IT Polymers, uses
(polynuclear metal complex-doped; polynuclear metal complexes, their preparation and use as phosphorescence emitters in electroluminescent layer arrangements)
- IT Electroluminescent devices
Phosphorescent substances
(polynuclear metal complexes, their preparation and use as phosphorescence emitters in electroluminescent layer arrangements)
- IT Transition metal complexes
(polynuclear metal complexes, their preparation and use as phosphorescence emitters in electroluminescent layer arrangements)
- IT Coordination compounds
(polynuclear; polynuclear metal complexes, their preparation and use as phosphorescence emitters in electroluminescent layer arrangements)
- IT Conducting polymers
(polythiophenes, cationic, hole-injecting layer; polynuclear metal complexes, their preparation and use as phosphorescence emitters in electroluminescent layer arrangements)
- IT 124-41-4, Sodium methanolate 497-19-8, Sodium carbonate (Na₂CO₃), uses 584-08-7, Potassium carbonate (K₂CO₃)
(base, polynuclear metal complex prepared using; polynuclear metal complexes, their preparation and use as phosphorescence emitters in electroluminescent layer arrangements)
- IT 4733-39-5, 2,9-Dimethyl-4,7-diphenyl[1,10]phenanthroline 34777-53-2
150405-69-9, TAZ 399038-18-7
(hole-blocking layer; polynuclear metal complexes, their preparation and use as phosphorescence emitters in electroluminescent layer arrangements)
- IT 188049-41-4
(hole-blocking or electron-transport layer; polynuclear metal complexes, their preparation and use as phosphorescence emitters in electroluminescent layer arrangements)
- IT 15082-28-7, 2-(4-Biphenylyl)-5-(4-tert-butylphenyl)-1,3,4-oxadiazole
25067-59-8, Poly-N-vinylcarbazole 25190-62-9, Poly(1,4-phenylene)
58328-31-7 99627-56-2, Poly(9H-fluorene-2,7-diyl)
(polynuclear metal complex-doped; polynuclear metal complexes, their preparation and use as phosphorescence emitters in electroluminescent layer arrangements)
- IT 7439-88-5DP, Iridium, compds. 7440-06-4DP, Platinum, compds.
(polynuclear metal complexes, their preparation and use as phosphorescence emitters in electroluminescent layer arrangements)
- IT 67360-21-8P 116563-50-9P 658042-18-3P
(polynuclear metal complexes, their preparation and use as phosphorescence emitters in electroluminescent layer arrangements)
- IT 4434-23-5P 17911-94-3P 20425-75-6P 658042-16-1P 658042-17-2P
658043-91-5P 658043-92-6P 658043-93-7P 658043-94-8P
658043-95-9P

(polynuclear metal complexes, their preparation and use as phosphorescence emitters in electroluminescent layer arrangements)

IT 90-02-8, 2-Hydroxybenzaldehyde, reactions 101-77-9
 108-45-2, m-Phenylenediamine, reactions 646-25-3, 1,10-Decanediamine
 2479-47-2 2783-17-7, 1,12-Diaminododecane 3377-24-0 4097-89-6
 85642-05-3 118727-34-7, 1,3,5-Tris(4-aminophenyl)benzene
 343978-72-3 417705-49-8

(polynuclear metal complexes, their preparation and use as phosphorescence emitters in electroluminescent layer arrangements)

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD (1 CITINGS)

L64 ANSWER 7 OF 10 HCPLUS COPYRIGHT 2010 ACS on STN
 ACCESSION NUMBER: 2003:817598 HCPLUS Full-text
 DOCUMENT NUMBER: 139:314295
 TITLE: Organic electroluminescence element
 INVENTOR(S): Oshiyama, Tomohiro; Kita, Hiroshi; Yamada, Taketoshi
 PATENT ASSIGNEE(S): Konica Corporation, Japan
 SOURCE: Eur. Pat. Appl., 22 pp.
 CODEN: EPXXDW
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1353388	A2	20031015	EP 2003-7431	20030403 ---
EP 1353388	A3	20071128		
EP 1353388	B1	20100317		
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK				
JP 2004006287	A	20040108	JP 2003-90803	20030328 ---
EP 2192632	A1	20100602	EP 2010-154244	20030403 ---
R: DE, GB				
US 20030198831	A1	20031023	US 2003-410312	20030409 ---
US 7128982	B2	20061031		
US 20070015008	A1	20070118	US 2006-516285	20060906 ---
US 7592075	B2	20090922		
PRIORITY APPLN. INFO.:			JP 2002-110303	A 20020412 ---
			EP 2003-7431	A3 20030403 ---
			US 2003-410312	A3 20030409 ---

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB An organic electroluminescence element is disclosed which comprises a hole transporting layer containing a hole transporting material, a light emission layer containing a host compound and a phosphorescent compound, a hole blocking layer, and an electron transporting layer, the host compound having a band gap of 3.3-5 eV, and having a mol. weight of ≥ 500 , and relation $c < d$ being satisfied, wherein c (eV) represents a difference between energy level

of LUMO in the hole blocking layer and energy level of LUMO in the light emission layer and d (eV) represents a difference between energy level of HOMO in the hole blocking layer and energy level of HOMO in the light emission layer.

IT 439899-44-2

(organic electroluminescent element containing)

RN 439899-44-2 HCAPLUS

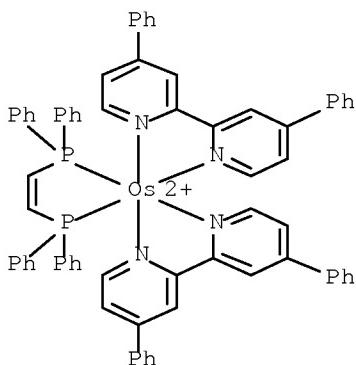
CN Osmium(2+), bis(4,4'-diphenyl-2,2'-bipyridine- κ N1, κ N1') [1,2-ethenediylbis[diphenylphosphine- κ P]]-, (OC-6-22)-, salt with heptafluorobutanoic acid (1:2) (9CI) (CA INDEX NAME)

CM 1

CRN 439899-43-1

CMF C70 H54 N4 Os P2

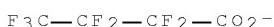
CCI CCS



CM 2

CRN 45048-62-2

CMF C4 F7 O2



IPCI H01L0051-30 [I,A]; H01L0051-05 [I,C*]; H01L0051-00 [I,C]; H01L0051-00 [I,A]

IPCR H01L0051-00 [I,C]; H01L0051-00 [I,A]; H01L0051-05 [I,C*]; H01L0051-30 [I,A]; H01L0051-50 [I,C*]; H01L0051-50 [I,A]

CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 76

ST org electroluminescent device phosphorescent compd
electron hole transporting layer

IT Phosphorescent substances
(in organic electroluminescent element)

IT Band gap

HOMO (molecular orbital)
 LUMO (molecular orbital)
 (of electron and hole transporting layers in organic
 electroluminescent element)

IT Electroluminescent devices
 (organic element)

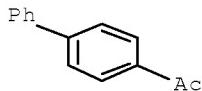
IT 2085-33-8, Tris(8-hydroxyquinolinato)aluminum 4733-39-5,
 2,9-Dimethyl-4,7-diphenyl-1,10-phenanthroline 16152-10-6,
 4-(1-Naphthyl)-3,5-diphenyl-1,2,4-triazole 31248-39-2 52309-01-0
 58328-31-7, 4,4'-Bis(N-carbazolyl)-1,1'-biphenyl 65181-79-5,
 2,2'-Dimethyl-4,4'-(N,N'-di(3-methylphenyl)-N,N'-diphenylamino]-1,1'-
 biphenyl 88821-71-0 94928-86-6 105465-14-3,
 3,3'-Dimethyl-4,4'-(N,N,N',N'-tetrakis(3-methylphenyl)amino]-1,1'-
 biphenyl 123847-85-8, α-NPD 149005-33-4 219303-85-2,
 2,4,4',4''-Tetrakis(N-carbazolyl)triphenylamine 337526-85-9,
 Acetylacetonebis[2-(2-pyridyl)phenyl]iridium 337526-98-4, Iridium,
 tris(benzo[h]quinolin-10-yl-κC,κN)-, (OC-6-22)-
 343978-78-9 343978-79-0 344796-22-1 344796-24-3 376367-93-0
 376367-95-2 387859-70-3 405171-87-1,
 N,N-Bis[2,5-dimethyl-4-[(3-methylphenyl)phenylamino]phenyl]-2,5-
 dimethyl-N'-(3-methylphenyl)-N'-phenyl-1,4-benzenediamine
 405173-85-5 439899-44-2 492446-97-6 497097-21-9
 567625-80-3 612519-47-8 612519-52-5 612519-55-8
 (organic electroluminescent element containing)

OS.CITING REF COUNT: 10 THERE ARE 10 CAPLUS RECORDS THAT CITE THIS
 RECORD (16 CITINGS)

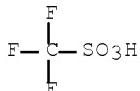
L64 ANSWER 8 OF 10 HCPLUS COPYRIGHT 2010 ACS on STN
 ACCESSION NUMBER: 2003:32888 HCPLUS Full-text
 DOCUMENT NUMBER: 138:245268
 TITLE: New class of hole-blocking amorphous
 molecular materials and their application in
 blue-violet-emitting fluorescent and
 green-emitting phosphorescent organic
 electroluminescent devices
 AUTHOR(S): Okumoto, Kenji; Shirota, Yasuhiko
 CORPORATE SOURCE: Department of Applied Chemistry, Faculty of
 Engineering, Osaka University, Yamadaoka, Suita,
 Osaka, 565-0871, Japan
 SOURCE: Chemistry of Materials (2003), 15(3),
 699-707
 CODEN: CMATEX; ISSN: 0897-4756
 PUBLISHER: American Chemical Society
 DOCUMENT TYPE: Journal
 LANGUAGE: English

AB A new class of hole-blocking amorphous mol. materials for use in organic
 electroluminescent (EL) devices were developed, which include 1,3,5-tri(4-
 biphenyl)benzene, 1,3,5-tris(4-fluorobiphenyl-4'-yl)benzene (F-TBB), 1,3,5-
 tri(9,9-dimethylfluoren-2-yl)benzene, and 1,3,5-tris[4-(9,9-dimethylfluoren-
 2-yl)phenyl]benzene. They readily form stable amorphous glasses with well-
 defined glass-transition temps. and are characterized by relatively high
 oxidation potentials and large HOMO-LUMO energy gaps. The use of these
 materials as hole blockers enabled blue-violet emission from several emitting
 amorphous mol. materials with hole-transporting properties in organic EL
 devices. A multilayer organic EL device using N,N-bis(9,9-dimethylfluoren-2-
 yl)aniline (F2PA) as a blue-violet emitter, F-TBB as a hole blocker, and
 4,4',4''-tris[3-methylphenyl(phenyl)amino]triphenylamine and tris(8-
 quinolinolato)aluminum as hole and electron transporters, resp., exhibited
 blue-violet emission peaking at 405 nm with a high external quantum efficiency
 of 1.95%. This device also enabled the doping of a phosphorescent Ir complex,

tris(2-phenylpyridine)iridium ($\text{Ir}(\text{ppy})_3$), tuning the emission color from blue violet to green by excitation energy transfer from F2PA to $\text{Ir}(\text{ppy})_3$.
 IT 92-91-1, 4-Acetyl biphenyl 1493-13-6
 (synthesis of TBB; synthesis of organic hole-blocking amorphous mol. materials and application in fluorescent and phosphorescent organic electroluminescent devices)
 RN 92-91-1 HCPLUS
 CN Ethanone, 1-[1,1'-biphenyl]-4-yl- (CA INDEX NAME)



RN 1493-13-6 HCPLUS
 CN Methanesulfonic acid, 1,1,1-trifluoro- (CA INDEX NAME)



CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
 Section cross-reference(s): 22, 72, 76
 ST amorphous hole blocking org material synthesis; fluorescent phosphorescent light emitting device
 IT LUMO (molecular orbital)
 (HOMO gap; of organic hole blocking and light-emitting materials)
 IT HOMO (molecular orbital)
 (LUMO gap; of organic hole blocking and light-emitting materials)
 IT Electronic excitation
 Fluorescence
 (absorption and fluorescence maxima of organic hole blocking and light-emitting materials)
 IT Oxidation potential
 (half-wave; of organic hole blocking and light-emitting materials)
 IT Luminescence, electroluminescence
 (of electroluminescent devices containing organic hole blocking and light-emitting materials)
 IT Glass transition temperature
 HOMO (molecular orbital)
 LUMO (molecular orbital)
 (of organic hole blocking and light-emitting materials)
 IT Half wave potential
 (oxidation; of organic hole blocking and light-emitting materials)
 IT Electroluminescent devices

- Hole (electron)
(synthesis of organic hole-blocking amorphous mol. materials and application in fluorescent and phosphorescent organic electroluminescent devices)
- IT 50926-11-9, Indium tin oxide
(anode; synthesis of organic hole-blocking amorphous mol. materials and application in fluorescent and phosphorescent organic electroluminescent devices)
- IT 37271-44-6
(cathode; synthesis of organic hole-blocking amorphous mol. materials and application in fluorescent and phosphorescent organic electroluminescent devices)
- IT 6326-64-3P 372956-40-6P 441352-90-5P 441352-91-6P
(hole blocking material; synthesis of organic hole-blocking amorphous mol. materials and application in fluorescent and phosphorescent organic electroluminescent devices)
- IT 65181-78-4, TPD
(light emitting material; synthesis of organic hole-blocking amorphous mol. materials and application in fluorescent and phosphorescent organic electroluminescent devices)
- IT 134008-76-7P 165320-27-4P 246857-02-3P
(light emitting material; synthesis of organic hole-blocking amorphous mol. materials and application in fluorescent and phosphorescent organic electroluminescent devices)
- IT 94928-86-6
(phosphorescent organic electroluminescent device; synthesis of organic hole-blocking amorphous mol. materials and application in fluorescent and phosphorescent organic electroluminescent devices)
- IT 151417-38-8P, 1,3,5-Tris(4-iodophenyl)benzene
(reactant for synthesis of F-TBB, TFPB; synthesis of organic hole-blocking amorphous mol. materials and application in fluorescent and phosphorescent organic electroluminescent devices)
- IT 144981-85-1P, 9,9-Dimethyl-2-iodofluorene
(reactant for synthesis of F2PA; synthesis of organic hole-blocking amorphous mol. materials and application in fluorescent and phosphorescent organic electroluminescent devices)
- IT 16218-28-3P, 2,7-Diiodofluorene 355832-04-1P,
N-(9,9-Dimethylfluoren-2-yl)aniline
(reactant for synthesis of PFFA; synthesis of organic hole-blocking amorphous mol. materials and application in fluorescent and phosphorescent organic electroluminescent devices)
- IT 612-71-5, 1,3,5-Triphenylbenzene
(synthesis of 1,3,5-tris(4-iodophenyl)benzene; synthesis of organic hole-blocking amorphous mol. materials and application in fluorescent and phosphorescent organic electroluminescent devices)
- IT 7553-56-2, Iodine, reactions 10450-60-9, Periodic acid (H₅IO₆)
(synthesis of 2-iodofluorene, 2,7-diiodofluorene, 1,3,5-tris(4-iodophenyl)benzene; synthesis of organic hole-blocking amorphous mol. materials and application in fluorescent and phosphorescent organic electroluminescent devices)
- IT 86-73-7, Fluorene

- (synthesis of 2-iodofluorene, 2,7-diiodofluorene; synthesis of organic hole-blocking amorphous mol. materials and application in fluorescent and phosphorescent organic electroluminescent devices)
- IT 74-88-4, Methyl iodide, reactions 865-47-4
(synthesis of 9,9-dimethyl-2-iodofluorene, 9,9-dimethyl-2,7-diiodofluorene; synthesis of organic hole-blocking amorphous mol. materials and application in fluorescent and phosphorescent organic electroluminescent devices)
- IT 2523-42-4P, 2-Iodofluorene
(synthesis of 9,9-dimethyl-2-iodofluorene, 9,9-dimethyl-2,7-diiodofluorene; synthesis of organic hole-blocking amorphous mol. materials and application in fluorescent and phosphorescent organic electroluminescent devices)
- IT 14221-01-3, Tetrakis(triphenylphosphine)palladium
(synthesis of F-TBB, TFB, TFPB; synthesis of organic hole-blocking amorphous mol. materials and application in fluorescent and phosphorescent organic electroluminescent devices)
- IT 1765-93-1, 4-Fluorophenylboronic acid
(synthesis of F-TBB; synthesis of organic hole-blocking amorphous mol. materials and application in fluorescent and phosphorescent organic electroluminescent devices)
- IT 108-67-8, Mesitylene, uses
(synthesis of F2PA, p-BPD, PFPA; synthesis of organic hole-blocking amorphous mol. materials and application in fluorescent and phosphorescent organic electroluminescent devices)
- IT 7440-50-8, Copper, uses
(synthesis of N-(9,9-Dimethylfluoren-2-yl)aniline, 1,3,5-tris(4-iodophenyl)benzene, PFPA; synthesis of organic hole-blocking amorphous mol. materials and application in fluorescent and phosphorescent organic electroluminescent devices)
- IT 62-53-3, Aniline, reactions
(synthesis of N-(9,9-Dimethylfluoren-2-yl)aniline, F2PA; synthesis of organic hole-blocking amorphous mol. materials and application in fluorescent and phosphorescent organic electroluminescent devices)
- IT 144981-86-2P, 9,9-Dimethyl-2,7-diiodofluorene
(synthesis of N-(9,9-Dimethylfluoren-2-yl)aniline; synthesis of organic hole-blocking amorphous mol. materials and application in fluorescent and phosphorescent organic electroluminescent devices)
- IT 92-91-1, 4-Acetyl biphenyl 1493-13-6
(synthesis of TBB; synthesis of organic hole-blocking amorphous mol. materials and application in fluorescent and phosphorescent organic electroluminescent devices)
- IT 333432-28-3
(synthesis of TFB, TFPB; synthesis of organic hole-blocking amorphous mol. materials and application in fluorescent and phosphorescent organic electroluminescent devices)
- IT 626-39-1, 1,3,5-Tribromobenzene
(synthesis of TFB; synthesis of organic hole-blocking amorphous mol. materials and application in fluorescent and phosphorescent organic electroluminescent devices)
- IT 2085-33-8, AlQ₃ 124729-98-2
(synthesis of organic hole-blocking amorphous mol. materials

and application in fluorescent and phosphorescent organic electroluminescent devices)

IT 1591-31-7, 4-Iodobiphenyl 84161-87-5, N,N-Diphenylbenzidine
(synthesis of p-BPD; synthesis of organic hole-blocking amorphous mol. materials and application in fluorescent and phosphorescent organic electroluminescent devices)

RETABLE

Referenced Author (RAU)	Year (R PY)	VOL (R VL)	PG (R PG)	Referenced Work (RWK)	Referenced File
Adachi, C	1990	56	799	Appl Phys Lett	HCAPLUS
Baldo, M	1999	75	4	Appl Phys Lett	HCAPLUS
Baldo, M	1999	75	4	Appl Phys Lett	HCAPLUS
Baldo, M	1998	395	151	Nature	HCAPLUS
Chan, L	2001	13	1637	Adv Mater	HCAPLUS
Garten, F	1997	85	1253	Synth Met	HCAPLUS
Grem, G	1992	4	36	Adv Mater	HCAPLUS
Hamada, Y	1992	31	1812	Jpn J Appl Phys	HCAPLUS
Hoshino, S	2000	87	1968	J Appl Phys	HCAPLUS
Hosokawa, C	1995	67	3853	Appl Phys Lett	HCAPLUS
Huang, J	1997	87	105	Synth Met	HCAPLUS
Ikai, M	2001	79	156	Appl Phys Lett	HCAPLUS
Ishikawa, W	1991		1731	Chem Lett	HCAPLUS
Ishikawa, W	1993	26	B94	J Phys D	HCAPLUS
Jiang, X	2000	76	1813	Appl Phys Lett	HCAPLUS
Kido, J	1993	63	2627	Appl Phys Lett	HCAPLUS
Kido, J	1996		47	Chem Lett	HCAPLUS
Kido, J	1993	32	L917	Jpn J Appl Phys	HCAPLUS
Kijima, Y	1999	38	5274	Jpn J Appl Phys	HCAPLUS
Kinoshita, M	2001		614	Chem Lett	HCAPLUS
Kuwabara, Y	1994	6	677	Adv Mater	HCAPLUS
Lamansky, S	2001	123	4304	J Am Chem Soc	HCAPLUS
Lee, C	2000	77	2280	Appl Phys Lett	HCAPLUS
Mitschke, U	2000	10	1471	J Mater Chem	HCAPLUS
Noda, T	1999	11	283	Adv Mater	HCAPLUS
Noda, T	2000	87-89	1168	J Lumin	HCAPLUS
Ogawa, H	1997	91	243	Synth Met	HCAPLUS
Ohmori, Y	1991	30	L1941	Jpn J Appl Phys	
Okumoto, K	2001	79	1231	Appl Phys Lett	HCAPLUS
Okumoto, K	2001		1034	Chem Lett	
Okumoto, K	2001	85	135	Mater Sci Eng B	
Robinson, M	2001	11	413	Adv Funct Mater	HCAPLUS
Romero, D	1997	9	1158	Adv Mater	HCAPLUS
Salbeck, J	1997	91	209	Synth Met	HCAPLUS
Shirota, Y	1994	65	1807	Appl Phys Lett	HCAPLUS
Shirota, Y	1989		1145	Chem Lett	HCAPLUS
Shirota, Y	2000	122	11021	J Am Chem Soc	HCAPLUS
Shirota, Y	2000	10	1	J Mater Chem	HCAPLUS
Shirota, Y	2000	111-1	387	Synth Met	HCAPLUS
Stolka, M	1984	88	4707	J Phys Chem	HCAPLUS
Tang, B	2001	11	2974	J Mater Chem	HCAPLUS
Ueta, E	1994		2397	Chem Lett	HCAPLUS
Wu, C	2002	81	577	Appl Phys Lett	HCAPLUS
Yang, Y	1996	79	934	J Appl Phys	HCAPLUS
Zou, L	2001	79	2282	Appl Phys Lett	HCAPLUS
OS.CITING REF COUNT:	62	THERE ARE 62 CAPLUS RECORDS THAT CITE THIS RECORD (65 CITINGS)			

August 16, 2010

10/581,005

47

DOCUMENT NUMBER: 137:377262
 TITLE: High efficiency multi-color electro-phosphorescent OLEDs
 INVENTOR(S): D'Andrade, Brian; Thompson, Mark E.; Forrest, Stephen R.
 PATENT ASSIGNEE(S): The Trustees of Princeton University, USA; The University of Southern California
 SOURCE: PCT Int. Appl., 50 pp.
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2002091814	A2	20021121	WO 2002-US14956	20020513
			<--	
WO 2002091814	A3	20030327		
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZM, ZW RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
AU 2002305548	A1	20021125	AU 2002-305548	20020513
			<--	
US 20020197511	A1	20021226	US 2002-144419	20020513
			<--	
US 7009338	B2	20060307		
EP 1390962	A2	20040225	EP 2002-734378	20020513
			<--	
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JP 2004522276	T	20040722	JP 2002-588742	20020513
			<--	
JP 4493915	B2	20100630		
CN 1543659	A	20041103	CN 2002-811783	20020513
			<--	
CN 1302565	C	20070228		
KR 888424	B1	20090311	KR 2003-714984	20031117
			<--	
IN 2003DN01950	A	20051216	IN 2003-DN1950	20031118
			<--	
US 20050282036	A1	20051222	US 2005-211385	20050824
			<--	
US 7285907	B2	20071023		
PRIORITY APPLN. INFO.:			US 2001-291496P	P 20010516
			<--	
			US 2002-144419	A1 20020513
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			WO 2002-US14956	W 20020513
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ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

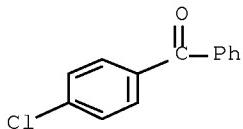
AB An organic light emitting device is described comprising an anode; a hole transporting layers; an emissive region; an electron transporting layer; and a

cathode; wherein the emissive region is comprising a host material and a multiple emissive dopants to generate white emission, and wherein the emissive region is comprising a multiple bands and each emissive dopant is doped into a sep. band within the emissive region, and wherein at least one of the emissive dopants emits light by phosphorescence.

IT 134-85-0
 (red emission layer; high efficiency multi-color electro-phosphorescent organic LEDs)

RN 134-85-0 HCAPLUS

CN Methanone, (4-chlorophenyl)phenyl- (CA INDEX NAME)



IPCI H01L [ICM]

IPCR C09K0011-06 [I,C*]; C09K0011-06 [I,A]; H01J0001-00 [I,C*]; H01J0001-74 [I,A]; H01J0029-18 [I,C*]; H01J0029-32 [I,A]; H01L0051-50 [I,C*]; H01L0051-50 [I,A]; H05B0033-14 [I,C*]; H05B0033-14 [I,A]

CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 76

ST electro phosphorescence light emitting diode multi color

IT Electroluminescent devices
 (high efficiency multi-color electro-phosphorescent organic LEDs)

IT 376367-93-0
 (blue phosphor dopant; high efficiency multi-color electro-phosphorescent organic LEDs)

IT 7429-90-5, Aluminum, uses
 (cathode; high efficiency multi-color electro-phosphorescent organic LEDs)

IT 94928-86-6
 (green emission dopant; high efficiency multi-color electro-phosphorescent organic LEDs)

IT 2085-33-8, Alq3 7789-24-4, Lithium fluoride (LiF), uses 16152-10-6 50851-57-5, Poly(styrene sulfonic acid) 50926-11-9, Indium tin oxide 123847-85-8, α -NPD 126213-51-2, PEDOT 337526-88-2
 (high efficiency multi-color electro-phosphorescent organic LEDs)

IT 4733-39-5, 2,9-Dimethyl-4,7-diphenyl-1,10-phenanthroline
 (hole-blocking layer; high efficiency multi-color electro-phosphorescent organic LEDs)

IT 134-85-0
 (red emission layer; high efficiency multi-color electro-phosphorescent organic LEDs)

IT 343978-79-0
 (red emissive layer dopant; high efficiency multi-color electro-phosphorescent organic LEDs)

RETABLE

Referenced Author (RAU)	Year VOL PG Referenced Work (RPY) (RVL) (RPG)	Referenced (RWK)	Referenced File
----------------------------	--	---------------------	-----------------

Anon				US 5707745 A	HCAPLUS
Anon				US 5837391 A	HCAPLUS
OS.CITING REF COUNT:	27	THERE ARE 27 CAPIPLUS RECORDS THAT CITE THIS RECORD (43 CITINGS)			

L64 ANSWER 10 OF 10 HCAPLUS COPYRIGHT 2010 ACS on STN
 ACCESSION NUMBER: 2002:221136 HCAPLUS Full-text
 DOCUMENT NUMBER: 136:254380
 TITLE: Organometallic complexes as phosphorescent emitters in organic LEDs
 INVENTOR(S): Thompson, Mark E.; Djurovich, Peter; Lamansky, Sergey; Murphy, Drew; Kwong, Raymond; Abdel-Razzaq, Feras; Forrest, Stephen R.; Baldo, Marc A.; Burrows, Paul E.
 PATENT ASSIGNEE(S): The Trustees of Princeton University, USA; The University of Southern California
 SOURCE: U.S. Pat. Appl. Publ., 77 pp., Cont.-in-part of U. S. Ser. No. 274,609, abandoned.
 CODEN: USXXCO
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 5
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 20020034656	A1	20020321	US 2001-883734	20010618
			<--	
US 6830828	B2	20041214		
US 6097147	A	20000801	US 1998-153144	19980914
			<--	
EP 1729327	A1	20061206	EP 2006-16911	20000511
			<--	
R: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LI, LU, MC, NL, PT, SE, AL, LT, LV, MK, RO, SI				
CN 101312235	A	20081126	CN 2008-10129336	20000511
			<--	
CN 1840607	A	20061004	CN 2005-10109631	20001129
			<--	
EP 1933395	A1	20080618	EP 2008-3327	20001129
			<--	
R: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LI, LU, MC, NL, PT, SE, TR, AL, LT, LV, MK, RO, SI				
US 20030017361	A1	20030123	US 2002-171235	20020613
			<--	
US 6902830	B2	20050607		
US 20040262576	A1	20041230	US 2004-870788	20040616
			<--	
US 7001536	B2	20060221		
JP 2005344124	A	20051215	JP 2005-241794	20050823
			<--	
JP 4358168	B2	20091104		
US 20060029829	A1	20060209	US 2005-233605	20050922
			<--	
US 7291406	B2	20071106		
JP 2007254755	A	20071004	JP 2007-140927	20070528
			<--	
US 20070296332	A1	20071227	US 2007-879379	20070716
			<--	

August 16, 2010		10/581,005		50
US 7537844	B2	20090526		
US 20090209760	A1	20090820	US 2009-434259 <--	20090501
JP 2009224795	A	20091001	JP 2009-140434 <--	20090611
JP 2010070764	A	20100402	JP 2009-252135 <--	20091102
PRIORITY APPLN. INFO.:			US 1998-153144 <--	A2 19980914
			US 1999-274609 <--	B2 19990323
			US 1999-311126 <--	B2 19990513
			US 1999-452346 <--	B2 19991201
			CN 2000-807509 <--	A3 20000511
			EP 2000-932308 <--	A3 20000511
			JP 2000-619011 <--	A3 20000511
			CN 2000-817482 <--	A3 20001129
			EP 2000-980863 <--	A3 20001129
			JP 2001-541304 <--	A3 20001129
			US 2001-883734 <--	A3 20010618
			US 2002-171235 <--	A3 20020613
			US 2004-870788 <--	A1 20040616
			US 2005-233605 <--	A1 20050922
			US 2007-879379 <--	A1 20070716
			JP 2009-140434 <--	A3 20090611

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

OTHER SOURCE(S): MARPAT 136:254380

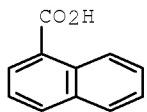
AB Emissive layers of organic light-emitting devices are described which comprise a phosphorescent organometallic compound for enhancing the quantum efficiency of the organic light-emitting device. Preferably the emissive mol. is selected from the group of phosphorescent organometallic complexes, including cyclometallated platinum, iridium, and osmium complexes. The organic light-emitting devices optionally contain an exciton blocking layer. In particular, organic light-emitting devices with an emitter layer comprising organometallic complexes of transition metals of formula L₂MX, wherein L and X are distinct bidentate ligandss and M is a metal which forms octahedral complexes, are described. A method of making a composition of the formula L₂MX is described which entails combining a bridged dimer of formula L₂M(μ-C₁)₂ML₂ with a Bronsted acid XH to make the desired organometallic complex. Display devices incorporating the light-emitting devices are also described.

IT 86-55-5, 1-Naphthoic acid 98-98-6, Picolinic acid 123-54-6, Acetylacetone, reactions

(organometallic complexes and their preparation and organic light-emitting devices using them as phosphorescent emitters)

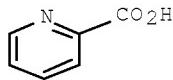
RN 86-55-5 HCAPLUS

CN 1-Naphthalenecarboxylic acid (CA INDEX NAME)



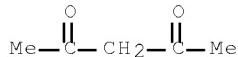
RN 98-98-6 HCAPLUS

CN 2-Pyridinecarboxylic acid (CA INDEX NAME)



RN 123-54-6 HCAPLUS

CN 2,4-Pentanedione (CA INDEX NAME)



INCL 428690000

IPCI H05B0033-14 [ICM,7]; C09K0011-06 [ICS,7]

IPCR C07D0209-00 [I,C*]; C07D0209-86 [I,A]; C09K0011-06 [I,C*]; C09K0011-06 [I,A]; H01L0051-05 [I,C*]; H01L0051-30 [I,A]; H01L0051-50 [I,C*]; H01L0051-50 [I,A]; H01L0051-00 [N,C*]; H01L0051-00 [N,A]

NCL 428/690.000; 252/301.160; 313/504.000; 313/506.000; 428/917.000; 257/102.000; 257/103.000

CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 74, 76, 78

ST organometallic compd phosphorescent emitter org light emitting device

IT Electroluminescent devices

(organic; organometallic complexes and their preparation and organic light-emitting devices using them as phosphorescent emitters)

IT Phosphorescent substances

(organometallic complexes and their preparation and organic light-emitting devices using them as phosphorescent emitters)

IT 2085-33-8, Tris(8-hydroxyquinolinato)aluminum 4733-39-5, 2,9-Dimethyl-4,7-diphenyl-1,10-phenanthroline 7440-04-2D, Osmium, compds. with organic ligands 9003-53-6, Polystyrene 25067-59-8, Polyvinylcarbazole 57102-62-2D, derivs. 58328-31-7 58328-31-7D, derivs. 88821-71-0 94928-86-6, fac-Tris(2-phenylpyridine)iridium 123847-85-8, 4,4'-Bis[N-(1-naphthyl)-N-phenylamino]biphenyl 180971-61-3 212385-75-6D, derivs. 344406-74-2D, derivs.

(organometallic complexes and their preparation and organic light-emitting devices using them as phosphorescent emitters)

IT 337526-86-0P 337526-88-2P 337526-89-3P 337526-98-4P
 343978-86-9P 343978-88-1P 343978-92-7P 343978-96-1P
 343978-99-4P 344426-19-3P

(organometallic complexes and their preparation and organic light-emitting devices using them as phosphorescent emitters)

IT 110077-26-4P 138736-22-8P 337526-85-9P 337526-87-1P
 337526-91-7P 343978-75-6P 343978-76-7P 343978-77-8P
 343978-78-9P 343978-79-0P

(organometallic complexes and their preparation and organic light-emitting devices using them as phosphorescent emitters)

IT 86-55-5, 1-Naphthoic acid 91-22-5, Quinoline, reactions
 95-55-6, 2-Aminophenol 98-98-6, Picolinic acid 108-86-1,
 Bromobenzene, reactions 110-02-1, Thiophene 110-86-1, Pyridine,
 reactions 123-54-6, Acetylacetone, reactions 148-24-3,
 8-Hydroxyquinoline, reactions 302-01-2, Hydrazine, reactions
 352-93-2, Diethyl sulfide 372-48-5, 2-Fluoropyridine 602-09-5,
 2,2'-Dihydroxy-1,1'-binaphthyl 615-36-1 1126-00-7,
 1-Phenylpyrazole 3117-65-5 4467-06-5, 2-(p-Tolyl)pyridine
 7726-95-6, Bromine, reactions 7758-02-3, Potassium bromide,
 reactions 10025-83-9, Iridium trichloride 10025-99-7, Potassium
 tetrachloroplatinate 15635-87-7 38215-36-0 53698-49-0,
 3-Methoxy-2-phenylpyridine 343978-74-5

(organometallic complexes and their preparation and organic light-emitting devices using them as phosphorescent emitters)

IT 1008-89-5P, 2-Phenylpyridine 1454-80-4P, 2,2'-Diaminobiphenyl
 2436-96-6P, 2,2'-Dinitrobiphenyl 3164-18-9P,
 2-(1-Naphthyl)benzoxazole 3319-99-1P, 2-(2-Thienyl)pyridine
 13029-09-9P, 2,2'-Dibromobiphenyl 34243-33-9P 57175-14-1P
 74866-28-7P, 2,2'-Dibromo-1,1'-binaphthyl 109306-86-7P
 116563-45-2P 343978-82-5P 343978-90-5P

(organometallic complexes and their preparation and organic light-emitting devices using them as phosphorescent emitters)

IT 15337-84-5P 15442-57-6P, cis-Dichlorobis-(diethyl sulfide)platinum
 128025-34-3P

(organometallic complexes and their preparation and organic light-emitting devices using them as phosphorescent emitters)

RETABLE

Referenced Author (RAU)	Year VOL PG	Referenced Work (RWP)	Referenced File
	(R PY) (R VL) (R PG)		
A. Von Zelewsky	1994 132 75	Coord. Chem. Rev.	
A. Von Zelewsky	1993 32 4585	Inorg. Chem.	
Abramovitch, R	1964 2175	J. Chem. Soc.	HCAPLUS
Adachi	1990 56 799	Appl. Phys. Lett	HCAPLUS
Adachi	1988 27 L269	Jpn. J. Appl. Phys	HCAPLUS
Adachi, C	2000 87 8049	J. Appl. Phys.	HCAPLUS
Anon	1991	JP 3289090	
Anon	1996	EP 0704915	HCAPLUS
Anon	1996	WO 9619792	
Anon	1997	WO 9733296	HCAPLUS
Anon	1997	WO 9748115	HCAPLUS
Anon	1997	WO 9748139	HCAPLUS

Anon	1998		WO 9850989	HCAPLUS
Anon	1998		WO 9858037	HCAPLUS
Anon	2002		WO 0202714	HCAPLUS
Anon	2002		WO 0215645	HCAPLUS
Anon	1999		Chemistry.ORG, Inter	
Ayyagari	1984		US 4455506 A	
Baldo	2000		US 6097147 A	HCAPLUS
Baldo	2000	43 750	Nature	
Baldo, M	1999	75 4	Applied Physics Lett	HCAPLUS
Baldo, M	1998	395 151	Nature	HCAPLUS
Baldo, M	2000	403 750	Nature	HCAPLUS
Baldo, M	1999		Physical Review B	HCAPLUS
Baldo, M	1999	71 2095	Pure Appl. Chem.	HCAPLUS
Barton	1995		US 5439794 A	HCAPLUS
Berg-Brennan	1996	35 3719	Inorg. Chem.	HCAPLUS
Boerner	1998		US 5756224 A	HCAPLUS
Bonafede, S	1986	90 3836	J. Phys. Chem.	HCAPLUS
Bulovic	1998		US 5834893 A	HCAPLUS
Bulovic	2000		US 6046543 A	HCAPLUS
Bulovic	1998	287 455	Chem. Phys. Lett.	HCAPLUS
Bulovic	1999		Chemical Physics Let	HCAPLUS
Burrows	1999		US 5917280 A	HCAPLUS
Burrows	1999		US 5981306 A	HCAPLUS
Burrows	2000		US 6013538 A	HCAPLUS
Burrows	2000		US 6048630 A	
Burrows	1996	69 2959	Appl. Phys. Lett.	HCAPLUS
Burrows, P	1994	65 2922	Appl. Phys. Lett	HCAPLUS
Butovic	1996	380 29	Nature	
Calogero, G	1995	34 541	Inorg. Chem.	HCAPLUS
Ch. Cornioley-Deuschel	1987	26 3354	Inorg. Chem.	
Chassot, L	1983	66 2443	Helv. Chim. Acta.	HCAPLUS
Chassot, L	1984	23 4249	Inorg. Chem.	HCAPLUS
Chassot, L	1987	26 2814	Inorg. Chem.	HCAPLUS
Chassot, L	1986	108 6084	J. Am. Chem. Soc.	HCAPLUS
Chen, C	1997	125 1	Macromolecular Sympo	
Chen, C	1997	125 49	Macromolecules Sympo	
Cleave	1999	11 285	Adv. Mater.	HCAPLUS
Cockburn, B	1973	4 404	Journal of the Chemi	
D.F. O'Brien	1999	74 442	Applied Physics Lett	
Dartnall, H	1983	220 115	Proc. Roy. Soc. B	HCAPLUS
Demas, J	1991	63 829	Analytical Chemistry	
Depp, S	1993		Scientific American	
Di G Marco	1998	70 5019	Anal. Chem. Dec.	
Dimarco, G	1996	8 576	Advanced Materials	HCAPLUS
Dirr, S	1997		SID 97 Digest	
Egusa	1994		US 5294810 A	HCAPLUS
Epstein	1997		US 5663573 A	HCAPLUS
Evans, J	1943	2 517	Org. Synth	
Forrest	1996		US 5554220 A	HCAPLUS
Forrest	1997		US 5703436 A	HCAPLUS
Forrest	1998		US 5707745 A	HCAPLUS
Forrest	1998		US 5757026 A	HCAPLUS
Forrest	1998		US 5757139 A	
Forrest	1999		US 5953587 A	HCAPLUS
Forrest	1999		US 5986268 A	HCAPLUS
Forrest	1999		US 5998803 A	HCAPLUS
Forrest	2000		US 6091195 A	HCAPLUS
Forrest	2000		US 6125226 A	HCAPLUS
Forrest	2002		US 6337102 B1	HCAPLUS
Forrest	2002		US 6358631 B1	HCAPLUS

Forrest, S	1997 97	1793	Chemical Reviews	HCAPLUS
Forrest, S	1995		Laser Focus World	
Franke	2000		US 6013429 A	HCAPLUS
Friend	1993		US 5247190 A	
Friend	1997		US 5698048 A	HCAPLUS
Friend	1999 397	121	Nature	HCAPLUS
Fuji	1997		US 5674597 A	
Fujii	1997		US 5601903 A	
Garbuзов	1999		US 5874803 A	HCAPLUS
Garbuзов, D	1996 249	433	Chemical Physics Let	HCAPLUS
Garbuзов, D	1996 80	4644	J. Appl. Phys	HCAPLUS
Gary Miessler	1999 2	1	Inorganic Chemistry	
Gary Miessler	1999 2	1	Inorganic Chemistry	
Gianini, M	1997 36	6094	Inorg. Chem.	HCAPLUS
Gilman, H	1949 71	1870	J. Am. Chem. Soc.	HCAPLUS
Gu	1998		US 5844363 A	HCAPLUS
Gu, G	1997 22	396	Optics Letters	HCAPLUS
Haase	1999		US 5989738 A	
Hey, D	1955	3963	J. Chem. Soc.	HCAPLUS
Hill, I	1999 86	2116	Journal of Applied P	HCAPLUS
Holmlin, R	1996 118	5236	J. Am. Chem. Soc.	HCAPLUS
Hoshino	1996 69	224	Appl. Phys. Lett.	HCAPLUS
Hosokawa	1995 67	3853	Appl. Phys. Lett	HCAPLUS
Hung, L	1997 70	152	Appl. Phys. Lett.	HCAPLUS
Johnson	1995 67	175	Pure Appl. Chem.	HCAPLUS
Johnson, C	1983 105	1795	Journal of the Ameri	HCAPLUS
Jolliet, P	1996 35	4883	Inorg. Chem.	HCAPLUS
Kathirgamanathan	2003		US 6524727 B1	HCAPLUS
Kauffman, G	1957 6	211	Inorg. Synth.	
Kaufmann, T	1983 116	992	Chem. Ber.	
Kido	1998		US 5834130 A	HCAPLUS
Kido, J	1994 65	2124	Appl Phys. Lett	HCAPLUS
Kido, J	1998 73	2721	Applied Physics Lett	HCAPLUS
Kido, J	1990	657	Chemistry Letters	HCAPLUS
Kido, J	1993 192	30	J. Alloys and Compou	HCAPLUS
Kido, J	1996 35	L394	Jpn. J. Appl. Phys.	HCAPLUS
King, K	1985 107	1431	J. Am. Chem. Soc.	HCAPLUS
Kirlin	1998		US 5840897 A	HCAPLUS
Kokado	1993		US 5203974 A	HCAPLUS
Kozlov	2000		US 6111902 A	HCAPLUS
Kozlov	2000		US 6160828 A	HCAPLUS
Kunugi, Y	1998 120	589	J. Am. Chem. Soc.	HCAPLUS
Lamansky	1999		ACS National Meeting	
Lee	1997		ACS National Meeting	
Lee	2000 77	2280	Appl. Phys. Lett.	HCAPLUS
Lee, J	1996 69	1686	Appl. Phys. Lett.	HCAPLUS
Lee, J	1997 9	1710	Chem. Mater.	HCAPLUS
Ma, Y	1999 11	852	Advanced Materials	HCAPLUS
Ma, Y	1998 94	245	Synthetic Metals	HCAPLUS
Macleod, H	1969	94	Thin Film Optical Fi	
Maestri, M	1992 17	1	Adv. Photochem.	HCAPLUS
Maestri, M	1985 122	375	Chem. Phys. Lett.	HCAPLUS
Maestri, M	1988 71	1053	Helv. Chim. Acta.	HCAPLUS
Mitsumori	1988		US 4758765 A	
Moore, R	1958 23	1504	J. Org. Chem.	HCAPLUS
Morikawa, M	1990	1041	The 51Autumn Meeting	
Namiki	1995		US 5457565 A	HCAPLUS
Newkome, G	1986 86	451	Chem. Rev.	HCAPLUS
Nishikitani	1993		US 5231329 A	HCAPLUS
Omae, I	1986		Organometallic Intra	

Perry		1990			US 4950950 A	HCAPLUS	
Ryabov, A		1990	90	403	Chem. Rev.	HCAPLUS	
Schewe, P		1999			The American Institut		
Shen		1999			US 5932895 A	HCAPLUS	
Shi		1996			US 5504183 A	HCAPLUS	
Shi		2000			US 6083634 A	HCAPLUS	
Shioya		2000			US 6091382 A		
Shoustikov, A		1998	4	3	IEEE Journal of Spec	HCAPLUS	
Shoustikov, A		1997	91	217	Synth. Met.	HCAPLUS	
Skotheim		1992			US 5128587 A	HCAPLUS	
Takaya, H		1989	67	20	Org. Synth.	HCAPLUS	
Tamano		1998			US 5811834 A	HCAPLUS	
Tang		1988			US 4769292 A	HCAPLUS	
Tang		1994			US 5294870 A	HCAPLUS	
Tang, C		1987	51	913	Appl. Phys. Lett.	HCAPLUS	
Tang, C		1989	65	3610	J. Appl. Phys.	HCAPLUS	
Tang, C		2001		18	SPIE's OE Magazine		
Thompson		1998			US 5811833 A	HCAPLUS	
Thompson		1999			US 5861219 A	HCAPLUS	
Thompson		1999			US 5986401 A	HCAPLUS	
Thompson		2000			US 6013982 A	HCAPLUS	
Thompson		2000			US 6030715 A		
Thompson		2000			US 6045930 A		
Thompson		2001			US 6242115 B1	HCAPLUS	
Thompson		2001			US 6303238 B1	HCAPLUS	
Tsutsui		1999	38	L1502	Jpn. J. Appl. Phys.	HCAPLUS	
Tsutsui, T		1991		437	Photochemical Proces	HCAPLUS	
Uehara, A		1982	239	1	J. Organomet. Chem.	HCAPLUS	
VanSlyke		1985			US 4539507 A		
Vestweber, H		1994	64	141	Synthetic Metals	HCAPLUS	
Vinodgopal, K		1995	99	10883	J. Phys. Chem.	HCAPLUS	
Whitlock		1993	32	1921	Optical Eng.	HCAPLUS	
Wiedenhofer, H		1995	99	13385	J. Phys. Chem.	HCAPLUS	
Wittmann, H		1994	101	2693	J. Chem. Phys.	HCAPLUS	
Wu, C		1996	69	3117	Appl. Phys. Lett	HCAPLUS	
Yamamoto		1996			US 5540999 A	HCAPLUS	
Yoo, D		1997	85	1425	Synthetic Metals	HCAPLUS	
Zollinger, H		1991	Secon		Color Chemistry		
OS.CITING REF COUNT:		116	THERE ARE 116 CAPLUS RECORDS THAT CITE THIS RECORD (151 CITINGS)				